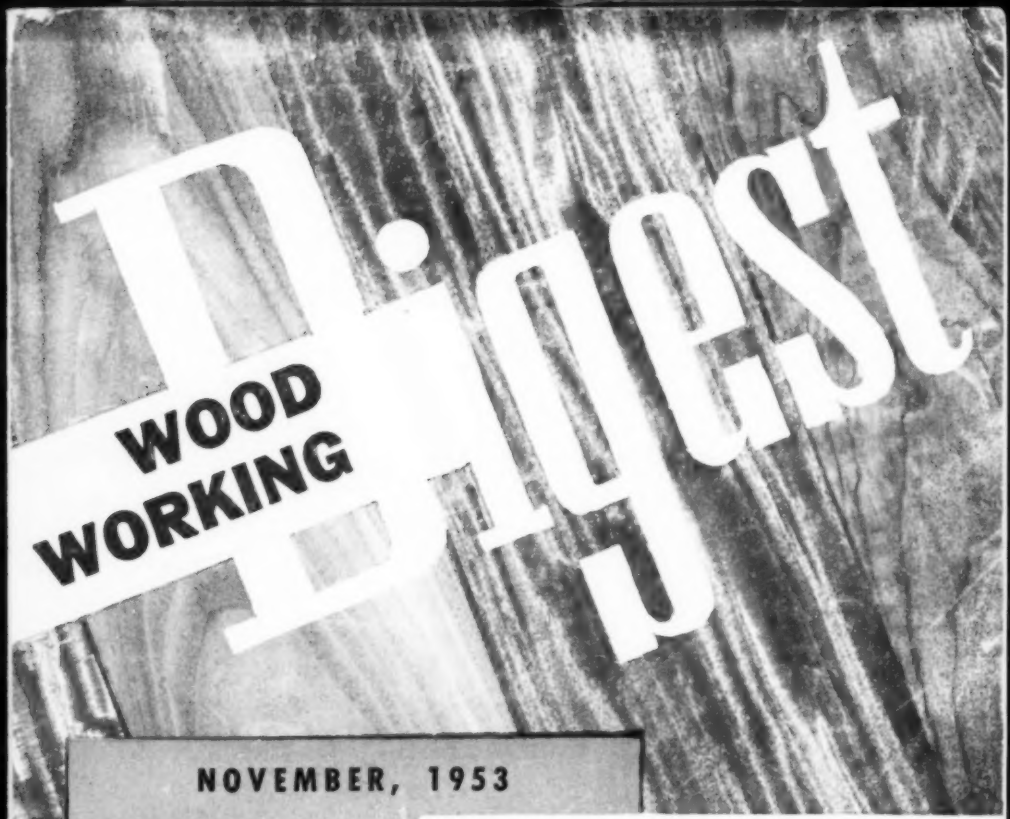

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A HITCHCOCK PUBLICATION

Acceptance under Section 34.64, P.L.&R., authorized

WOOD WORKING DIGEST

222 E. Willow Ave. Wheaton, Ill.

Form 3547 Requested Return Postage Guaranteed

UNIVERSITY MICROFILMS
ATT MR EUGENE B POWER
313 NO FIRST ST
ANN ARBOR
MICH

SPOTNAILS are improving furniture production methods

One shot no-split nailing!

THE SPOTNAILER

Light, portable, virtually indestructible nailing machine drives nail-like wire fasteners in sizes from 3/16" to 1⅛". Use Spotnails for fast, neat assembly of case backs, drawer bottoms and slides, panelling and dozens of other production fastening jobs.

THE SPOTPINNER

The familiar round 12 or 15 gauge sashpin in lengths up to 1¼" are now driven with one blow of a rubber mallet. Use Spotpins for pinning glued or unglued joints. Chisel points cut through grain of wood to avoid splitting. Flush driven or counter sunk without hammer marks.

A trial in your own plant will prove our claims of better work—lower cost.

SPOTNAILS, INC.

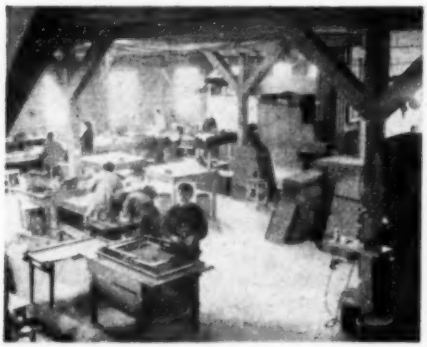
EVANSTON 1, ILLINOIS

How 20 workers make 500 tables a day with Weyerhaeuser pre-cut wood parts

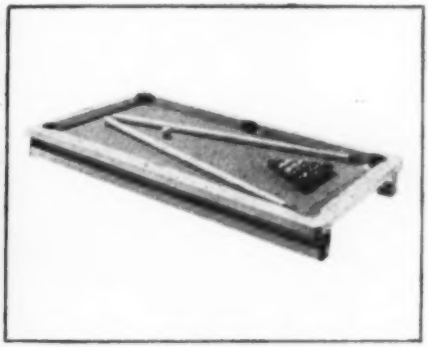
Two years ago a small firm, making juvenile pool tables, came to Weyerhaeuser. By having the table parts pre-cut by Weyerhaeuser, the firm was able to increase production with a minimum of factory space, workers and machines. In addition, Weyerhaeuser engineers helped cut the number of different sizes and shapes of parts needed from 26 to 12—for further savings in production costs.

Using Weyerhaeuser parts, 20 employees turned out up to 500 tables a day. This represents an annual total *double* what they could have produced working with standard lumber.

The manufacturer, the Den-Ricks Company of Farmington, Minnesota, reports steadily increasing production—and gives Weyerhaeuser Industrial Wood Parts credit for helping them achieve high output per worker and low unit costs.



Interior of Den-Ricks plant. Good production in small space, with a minimum of workers and equipment, is accomplished by using pre-cut wood parts.



About 20 workers manufacture, pack and ship 500 of these miniature pool tables in one day. Most of the workers are women.

FIND OUT HOW PRE-CUT PARTS CAN INCREASE YOUR PRODUCTION, CUT EXPENSES

A brief note, explaining your production problems, may permit us to quote prices that will increase your profits. Write now for full information.

Weyerhaeuser Sales Company

Industrial Wood Parts Department

ROOM 2136, 400 WEST MADISON, CHICAGO, ILLINOIS

WHY

our salesmen like to deal with you men who know

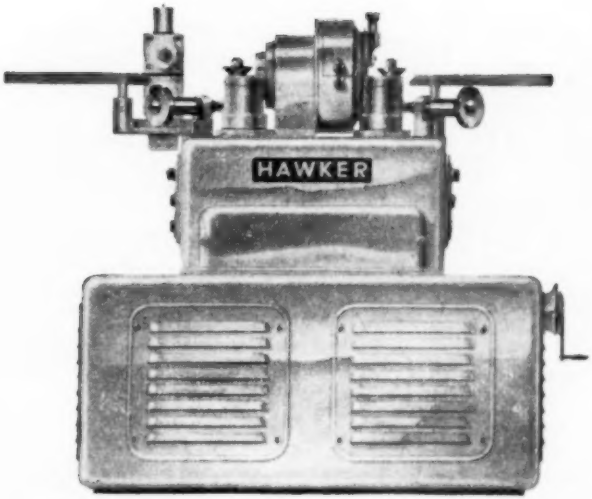
GLUE

Our field representatives have a *working* knowledge of the glues they sell. They are as at home in your glue room as they are at your glue buyer's desk. If you, too, like to deal with men who know glues — write or phone the National Casein office nearest you today.

You'll Stick with us Because we Stick for You!

National Casein

601 W. 80th St., Chicago 20, Ill. • Broad and Fulton Sts., Riverton, N. J.



waste less wood

You can do just that two ways with the Model 1000 Hawker Rod and Dowel Machine. First, you will waste less wood because only a very small fraction of the rounds you turn will be malformed or damaged. Second, you will get full round, saleable dowels out of inferior stock, scrap trimmings, off size, or odd shaped squares.

The Model 1000 Hawker is truly a new production machine, with so many features they cannot be detailed here. But there is a completely detailed story about this new Hawker waiting for your request. Write for it today; you should not be without this information.

HAWKER MANUFACTURING CO.

1425 KEOWEE STREET, DAYTON 4, OHIO

MACHINES FOR THE NEW AGE OF WOOD

BEACH No. 9 Precision Sander for PLASTICS METALS WOOD

A precision built machine for finishing plastics, metals or wood to extremely close tolerances. Speeds production and assures uniformly finished surface over entire sheet. Will feed material from 1/32 inch to 6 inches. Available in several sizes, ranging from 24 inches to 54 inches.

Write for Free Folder

BEACH

MANUFACTURING CO. MONTROSE PA

WOOD WORKING Digest

NOVEMBER, 1953
Vol. 55, No. 11

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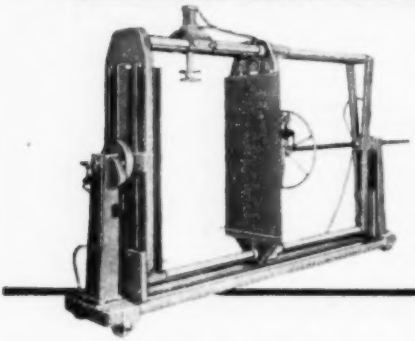
Clamps

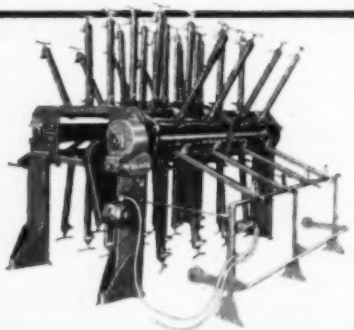


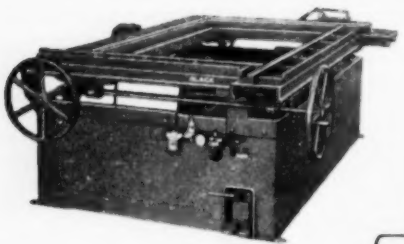
CASE CLAMPS

Massive tubular supports are mounted as fixed preloaded beams that will remain rigid and true, insuring accurate work under any load. No cast iron is used in any strain receiving member. Convenient controls and a powerful brake make operation easy and accurate. Write for Bulletin 11-J.

CLAMP CARRIERS

Black Clamp Carrieres are made in a practically unlimited range of sizes with respect to the number and width of sections and number, length and style of clamps. Carriers are made entirely of arc-welded and fabricated steel, providing an unbreakable frame and permitting flexibility of design. Write for Bulletin 11-K.





SASH AND FRAME CLAMPS

Black's two-way pneumatic clamps are mounted on a rigid, solid steel base with all controls conveniently grouped at the front. Valves and air supply lines are protected from damage by this base. Black clamps have been tested under production conditions, and proven to be fast, efficient and reliable. Write for Bulletin 11-M.

"If its gluing equipment—we have it"

THE BLACK BROTHERS CO., INC. **810 9th ST., MENDOTA, ILLINOIS**

New Products, New Profits

with *Siempelkamp* Presses

Efficient use of today's waste will play a big part in tomorrow's successful wood operations. A pioneer organization in contract molding of wood waste is Crown Plastics, Forest Hill, Tenn. They chose a **standard** Siempelkamp plywood press pictured below because of its **versatility,** along with dependability and economy. If you are thinking of going into laminating, hardboard or chipboard, let a Siempelkamp Hydraulic Press go to work for you.

Write

W I L C O **ILCO**

Machine Works

1301 N. Hollywood St., Memphis 8, Tenn.

or

HEYER SALES & ENGINEERING CO.

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Tel. Tacoma, BR 1605—Seattle, LOgan 0921

NEW

Red-I-Cut-"L"®

Sands the hard synthetics...
...FASTER, with less work!

Spar varnish used to be the "toughie" in finishes, but some of the modern synthetics make it look like a weakling... especially when you have to sand them! But CARBORUNDUM's new RED-I-CUT-"L" Waterproof Paper is designed to take on the toughest of them... to sand them quickly, easily, economically.

RED-I-CUT-"L"

(the "L" means lacquer) Waterproof Paper

...CUTS FAST
...RESISTS SOLVENTS
...LESSENS LOADING

It lasts up to 25% longer than other papers because the special bond that holds the grains to the tough backing prevents excessive loading... lets the grains cut more freely for a longer period of time. There's no need to soak it before use. It holds size and shape when wet.

YOUR CARBORUNDUM DISTRIBUTOR or salesman will arrange a test of new RED-I-CUT-"L" Waterproof Paper on your own finishing line. Phone him today! He's your expert consultant for every sanding and finishing problem.

Or, if you prefer, write to the Carborundum Company, Dept. WD 82-324, Niagara Falls, N. Y.

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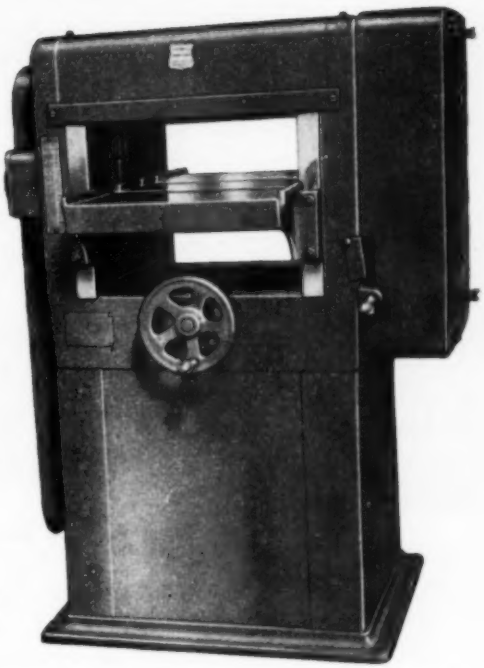
REGISTERED TRADE MARK

The ONLY source for EVERY abrasive product you need

POWERMATIC
LEADS THE WAY

WITH THIS MODEL 12 12" CABINET PLANER

AN EXTRA HEAVY DUTY SINGLE SURFACER, DESIGNED AND CONSTRUCTED FOR A LIFETIME



Complete cast iron construction. Heaviest designed machine of its size on the market.

All moving parts completely guarded for safe operation. Furnished with 1 or 2 HP motor, mounted in base.

Ideal for the Cabinet maker and small production shop.

Manufactured by

POWERMATIC MACHINE COMPANY

McMINNVILLE, TENN.

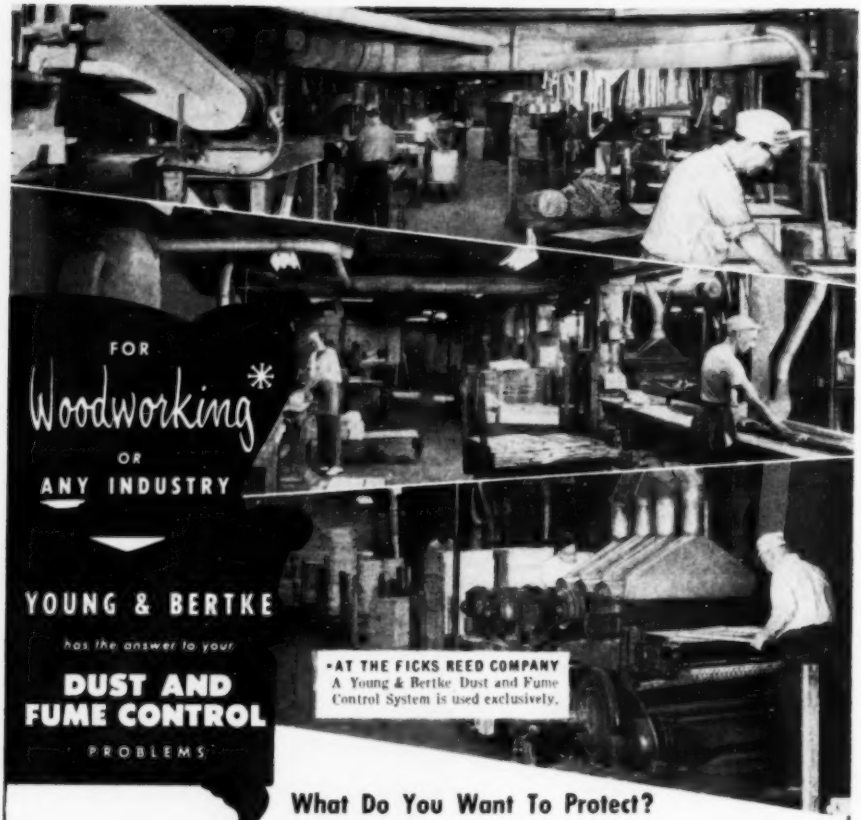
POWERMATIC MACHINE CO.
McMinnville, Tenn.

Please send me free literature on the No. 12-12" Single Surfacer.

Name .....

Address .....

City..... Zone.... State.....



What Do You Want To Protect?

At Ficks Reed Furniture Manufacturing Company it was wood-working machinery.

Whatever your Dust Control requirements, Young & Bertke engineers will bring a 45-year store of experience and the best of modern ingenuity to bear on it.

Name a basic material on industry's shopping list and chances are a Young & Bertke Finishing or Dust and Fume Control System has had a hand in its successful finish or manufacture.

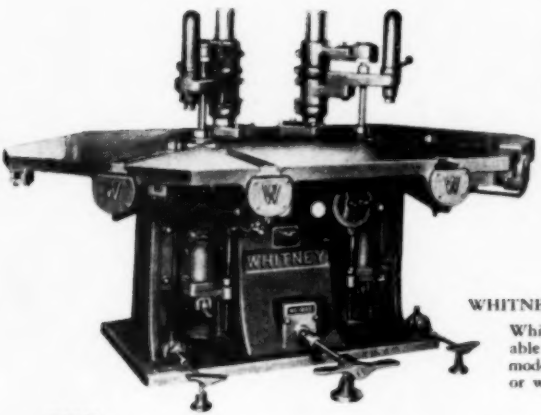
"YOUBERT"
Young & Bertke
the "hallmark" of quality
for fine Engineering,
Design and Fabrication.

The YOUNG & BERTKE Co.

DUST and FUME CONTROL • OVENS • SPRAY BOOTHS

1122 BUCK ST. CINCINNATI 14, OHIO

Replace HAND SHAPERS with WHITNEY AUTOMATIC SHAPERS



For Faster
Smoother
More Efficient
Lower Cost
Shaping

WHITNEY NO. 295 AUTOMATIC SHAPER

Whitney Automatic Shapers are available in single and double spindle models, several motor sizes and with or without high frequency operation.

Whitney Automatic Shapers can step-up your production several hundred percent over hand shaping, reduce labor expense and substantially lower your shaping costs. Work from Whitney Automatics is smooth, accurate and uniform, requiring little or no sanding. Set-ups and change-overs are quickly made with a minimum of down time. Whitney Automatic Shapers are ideal for short or long runs. Large or small pieces are easily handled such as panels, tops, chair parts, built-up assemblies, handles, etc. Square corners are faithfully reproduced. Whitney Automatic Shapers can save you money. Investigate them today.

In Our 116th Year

Write for shaper bulletin D11

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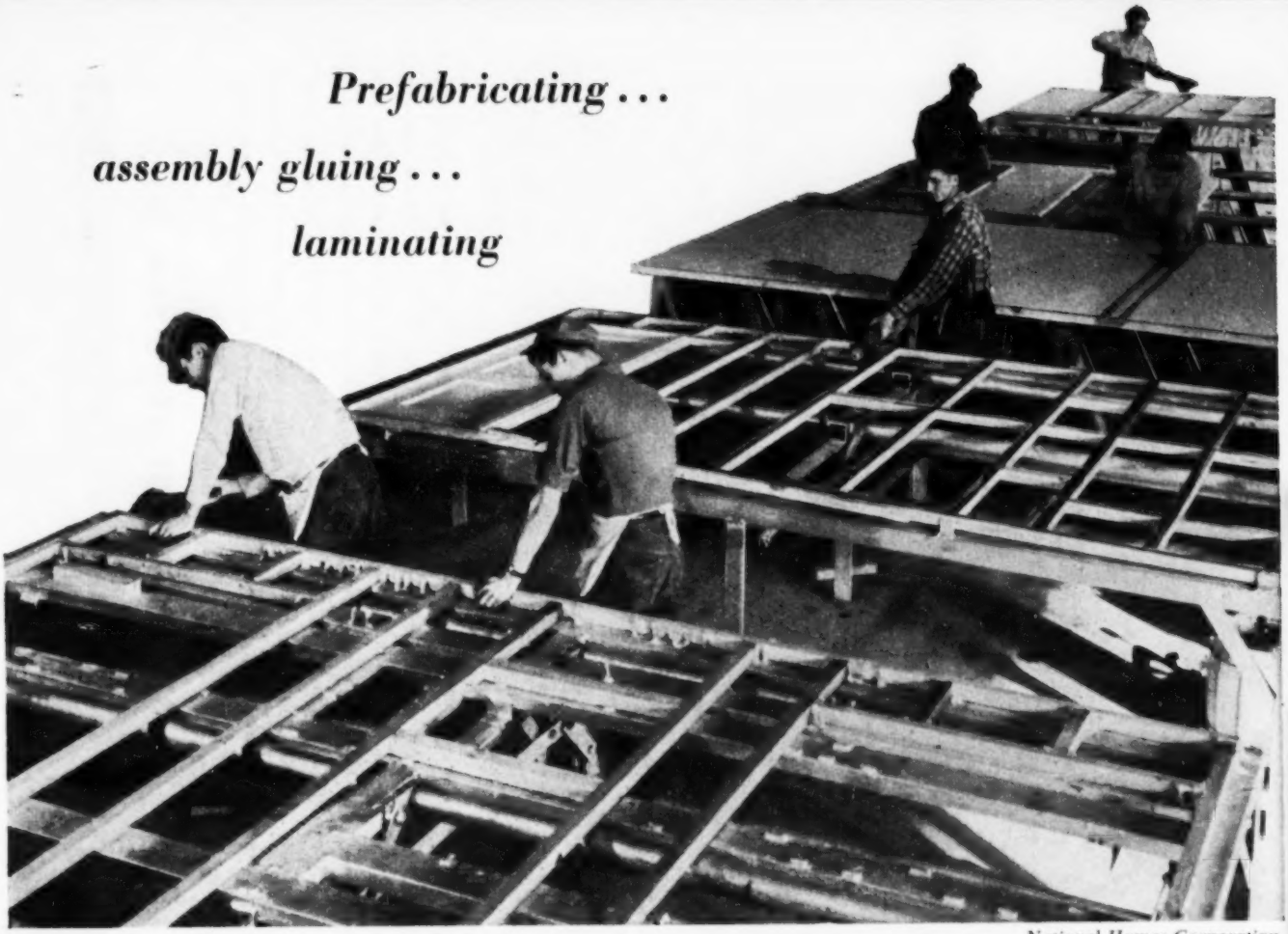
Quality Built Woodworking Machinery since 1837

PLANERS • SHAPERS • AUTOMATICS • VARIETY SAWS • BACK KNIFE LATHES

WINCHENDON, MASSACHUSETTS, U. S. A.



National Homes Corporation

National Homes Corporation

Get these **5** **advantages** *with Lauxein casein glues*

ADHESIVES FOR WESTERN INDUSTRY

Monsanto's Western Division manufactures and supplies a complete line of plywood and woodworking adhesives for western industry from conveniently located plants at Seattle, Washington, and Santa Clara, California.

Phenolic, melamine, urea, resorcinol, soybean and casein glues are included in this complete line for plywood production, edge gluing, and general assembly gluing.

For information on these adhesives, and on the entire line of Monsanto adhesives sold west of the Rocky Mountains, write TO: MONSANTO CHEMICAL COMPANY, 911 Western Ave., Seattle 4, Washington.

As the country's largest supplier of adhesives for the woodworking industry, Monsanto produces a complete line of Lauxein protein adhesives with *specific formulations* designed to solve your exact glue requirements. Here are the advantages delivered by Lauxein glues:

1. **Adjustable speed of cure . . . greatly increased speeds of cure possible with the right Lauxein glue.**
2. **Adaptability to plant temperature . . . consistently dependable bonds under fluctuating temperature conditions.**
3. **Lower bonding pressure . . . unusually strong bonds when minimum pressure is applied.**
4. **Glue line alkalinity . . . particularly desirable for bonding of certain pines, and bonding laminated plastics.**
5. **Durability . . . remarkable durability and water-resistance have been proved time and time again.**

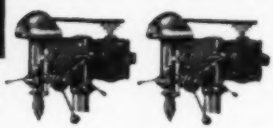
FREE BOOKLET: Full information on Lauxein casein and soybean glues for your applications—and the Monsanto-originated "No-Clamp" gluing process—is contained in a new booklet which is yours for the asking. Just write for "Lauxein Booklet." MONSANTO CHEMICAL COMPANY, Plastics Division, Room 5313, Springfield 2, Mass. (Monsanto in Canada: Montreal.) Lauxein: Reg. U. S. Pat. Off.

MONSANTO®

World's leading supplier of glues to Woodworking Industry

SERVING INDUSTRY . . . WHICH SERVES MANKIND

2 Atlas DRILL HEADS



+

INGENUITY

=

800% INCREASE IN PRODUCTION

With a little imagination, two ATLAS drill press heads (cost $76.00 each), two Mead air cylinders and a Mead Cycle Box, Chief engineer Pete Tuttle designed this unique set-up for the Steger Furniture Co., Steger, Ill. It automatically feeds, drills, countersinks and ejects TV cabinet corner blocks at the rate of 80 holes per minute . . . replaces two full-time employees . . . and increases production 800%. The operator simply fills the hopper.

The total cost of this set-up, including labor, was only $600. A special machine built outside would have cost approximately $2500. Mr. Tuttle chose ATLAS drills for their massive construction, accuracy and dependability. There's no doubt about it, you can DO so much MORE, so much BETTER with versatile, low cost ATLAS tools!

FREE! CATALOG OF WOOD-WORKING TOOLS

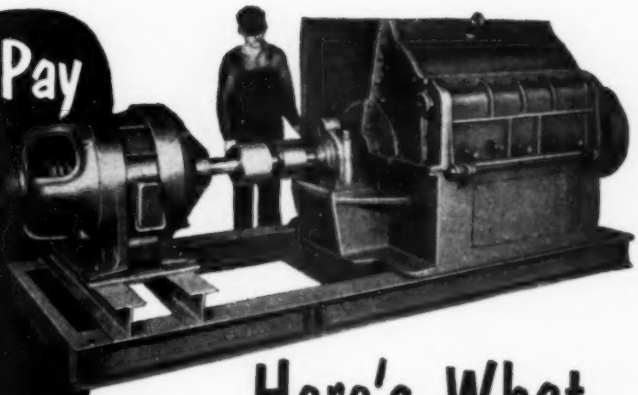
WRITE TODAY!

Atlas Press Company

DEPENDABLE QUALITY TOOLS SINCE 1911

1127 NO. PITCHER ST., KALAMAZOO, MICHIGAN

It Will Pay You To *CHECK* These Facts!



Here's What

WILLIAM'S "NO-NIFE" HOGS

✓ Can Do For You:

1. Increase The Heating Value Of Your Wood Scrap!

When reduced to chip form by hogging, wood burns more evenly—gets *all* the heat value possible. Unhogged slabs, trimmings, large pieces, restrict air flow, smother fire, result in inefficient combustion.

2. Improve Quality Of Wood Flour And Sawdust!

Processing wood scrap with a Williams Hog, for resale in the form of wood flour or sawdust, assures more uniform grinding and sizing—much lower labor costs—reduced power requirements.

3. Reduce Handling Cost As Much As 75%!

One man firing wood in chips can handle the same tonnage as would require three men if fuel scrap remained in awkward lengths and pieces that necessitate individual handling.

4. Your Operation May Permit Complete Automatic Handling

Williams has made many automatic installations to hog and convey waste wood to stoker or boiler at tremendous savings in handling expense. Other installations to automatically grind, separate and package wood flour and sawdust result in phenomenal reductions in cost.

Williams equipment will actually pay for itself in a few months, then continue to produce extra profits for many years. Investigate now!

Write for Details

WILLIAMS BUILDS A COMPLETE LINE • Hogging, Grinding & Shredding Machines • Vibrating Screens • Conveying Systems • Air & Mechanical Separators • Complete "Packaged" Plants • Cyclone Collectors

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WILLIAMS

CRUSHERS GRINDERS SHREDDERS

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

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FUNERAL SUPPLIES

Linahan Casket Co. Inc.

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NEW YORK 57 N Y
LUDLOW 3-0800

August 17th, 1953

Mr. F. M. Deane, President
Nelsonite Chemical Products, Inc.
900 Monroe Avenue
Grand Rapids, Michigan

Dear Mr. Deane:

Our first order for Nelsonite was placed with the hopes that it might help stabilize our stock. Our plant is not the best controlled plant as far as temperatures go. We have great variations from our Mill to our Finishing Department, and have felt that we could correct some conditions by using Nelsonite.

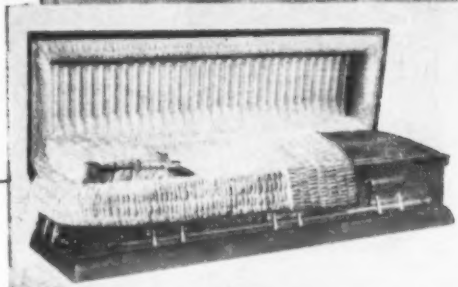
Let me say that not only did it stabilize the wood but it also has in other ways improved our products at a very low cost. We here at Linahan's are very well pleased with the results obtained by using Nelsonite, and unhesitatingly recommend it to anyone in any phase of the woodworking industry

Yours very truly,

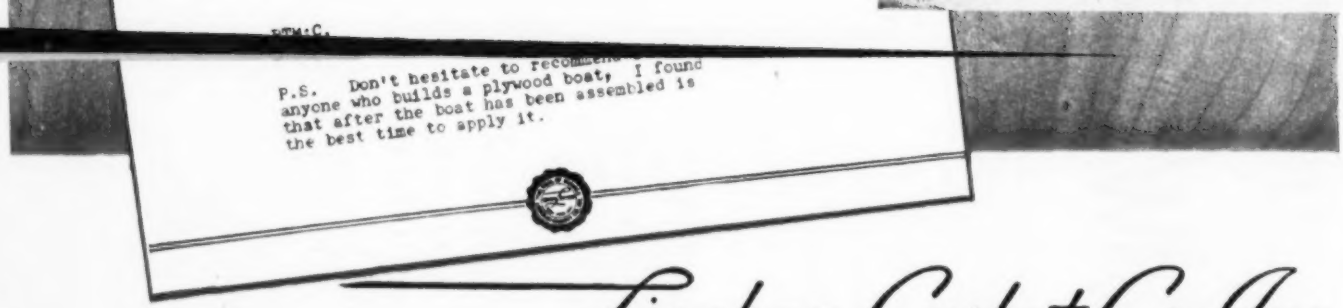
LINAHAN CASKET CO., INC

Basil T. Moore
President

BTM:C.



...t hesitate to recom... I found
...wood boat, ...ied is


P.S. Don't hesitate to
anyone who builds a plywood boat, I found
that after the boat has been assembled is
the best time to apply it.

Linahan Casket Co., Inc.

NELSONIZES Caskets

FOR WOOD STABILIZATION AND LONGER LIFE AT **Low Cost**

MORE AND MORE MANUFACTURERS ARE NELSONIZING THEIR PRODUCTS

1. **Guards against checking, splitting, swelling and warping**
2. **Gives their sales departments an extra sales aid in a buyer's market**
3. **Reduces the three r's—rejects, repairs and reworks**
4. **Reduces costs and increases efficiency**

WHY DON'T YOU TRY IT? ⟶

NELSONITE
CHEMICAL PRODUCTS INC.

900 Monroe Avenue, N.W.,
Grand Rapids 2, Michigan.

We are interested in a NELSONITE formula for the following wood and wood products:_____

Please send us sample to meet our individual specifications, and suggested tests for us to make, at no charge.

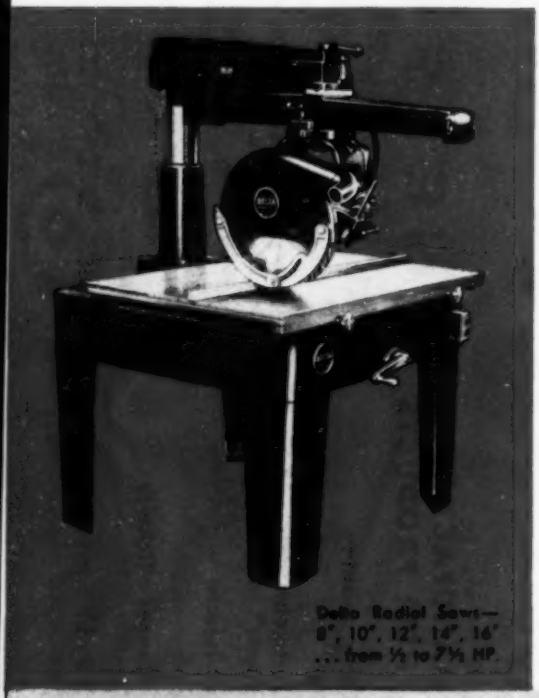
NAME_____

FIRM NAME_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Boost Output — cut with DELTA RADIAL SAW



Delta Radial Saws—
8", 10", 12", 14", 16"
... from ½ to 7½ HP.

You're tooled up for high speed production at lowest cost with a Delta Radial Saw—

- eliminate costly handling operations
- mass produce standard cutting jobs
- reduce scrap to a minimum
- bigger output with fewer man-hours, less operator fatigue

You know the rugged dependability and accuracy of Delta Radial Saws. Famous for their easy operation, utmost safety and top value.

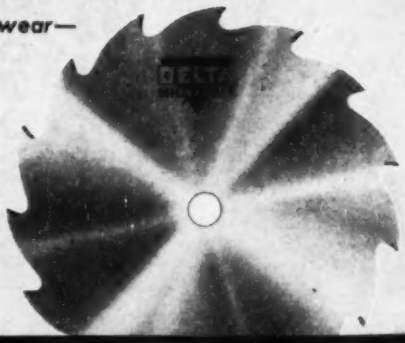
DELTA
MILWAUKEE

DELTA QUALITY MAKES THE DIFFERENCE

For faster, smoother cutting with less blade wear—

DELTA Carbide Tipped Blades—
NOW AT POPULAR PRICES

- **cut all woods and wood laminates**
- **cut 25 to 100 times longer than ordinary blades, without resharpening. Cutting teeth are tungsten carbide, hardest known applicable metal.**
- **available in standard and 8 tooth designs**
- **Prompt and efficient reconditioning service available from your Delta dealer**



costs to the bone and DELTA CIRCULAR SAW

For tops in straight-line production and ideal cost-cutting teamwork, put a Delta Tilting Arbor Saw in line with your Delta Radial Saw.

- cut lengths on your radial saw, then rip on the table saw — a natural straight-line material flow; eliminates high-cost handling
- big capacity cuts
- outstanding safety features
- many Delta accessories . . . easily applied . . . expand usefulness

For accuracy, durability and safety, Delta circular saws are your "best buy."

DELTA QUALITY POWER TOOLS

Another Product of **Rockwell**

Locate your Delta dealer in your Classified Telephone Directory, under "Tools," or "Machinery." Ask for full information on Delta Saws, and Delta Carbide Tipped Blades.

Delta Power Tool Division
Rockwell Manufacturing Company
666-L N. Lexington Avenue
Pittsburgh 8, Pennsylvania

Please send literature on
- ☐ Delta Radial and Circular Saws
- ☐ Delta Carbide Tipped Blades

and ☐ Send name of my nearest Delta dealer

Name _____ Title _____

Company _____

Address _____

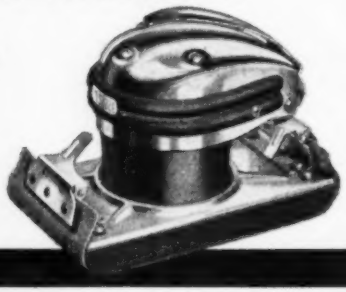
City _____ Zone _____ State _____

NATIONAL SANDERS

FOR RAPID STOCK REMOVAL . . .

MODEL 400

ORBITAL ACTION
AIR DRIVEN
SINGLE PAD



FOR FINISHING WITH THE GRAIN . . .

MODEL 600

STRAIGHT LINE ACTION
AIR DRIVEN
SINGLE PAD

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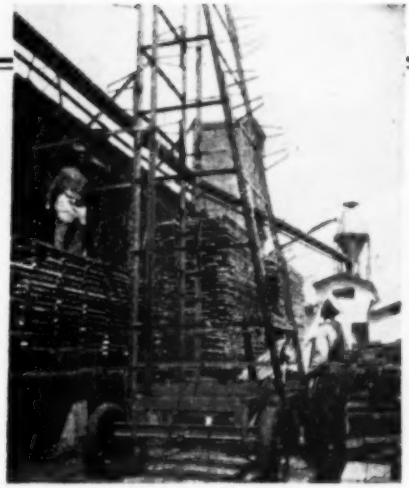
STACKERS

- **INCREASE YOUR PRODUCTION**
- **CUT LABOR COSTS**



● Standard Stackers, for yard or kiln load stacking, are especially designed to increase production, eliminate labor fatigue, and cut labor costs. *They actually pay for themselves in labor savings alone!* Besides doing the job quicker with fewer men, they reduce labor turnover by making lumber handling easier.

Two different types of sturdily-constructed Standard Stackers are available: the gasoline or electric powered Standard Workhorse (shown above), and the Standard Green Lumber Stacker. If neither of these two famous Standard Stackers answers *your* problem, we'll design one that does!

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a basically improved and approved resin glue

more PLUS Features

Freeze -Thaw Proof

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- **LOWER CLAMPING PRESSURES** produce high strength with as little as 10 psi—as proven by impartial tests. Reduces jig and case clamp costs; also clamping and releasing time.
- **HIGH HEAT RESISTANCE** Unlike ordinary

clamping and releasing time.

● **HIGH HEAT RESISTANCE.** Unlike ordinary polyvinyl acetates, WOOD-LOK's patented copolymer has been designed to resist the higher temperatures encountered in modern forced baking of wood finishes.

● **STRONGER BOND** coupled with high initial strength permits prompt handling of assemblies. Saves hours. No need to wait for glue to cure.

● **ALWAYS READY FOR USE.** No costly labor for preparation. No wastage due to hardening in glue pots.

● **FASTEST SETTING WOOD-LOK 3026** is unaffected by changes in temperature. Eliminates hot glue pots. Produces uniform setting regardless of shop temperatures.

● **GREATER VERSATILITY.** WOOD-LOK, which is unexcelled for the manufacture of case goods, is also unexcelled for laminating plastic/plywood dinette tops, gluing flush doors, and gluing composition and synthetic woods.

● **FULLY TESTED.** In production, as well as independent laboratories. Full details and copies of test results are available upon request. National's technical service is always available to you.

thawing in shipment or storage.

This special, fast setting vinyl copolymer can be shipped anywhere—anytime.

Now you need never switch to slower, less efficient and less durable glues in the winter months.

WOOD-LOK 3026 insures year 'round, uniform, fast production.

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☐ 5 gallon container. Bill me at the quantity drum price.
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Address_____

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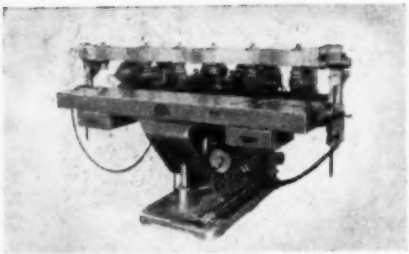
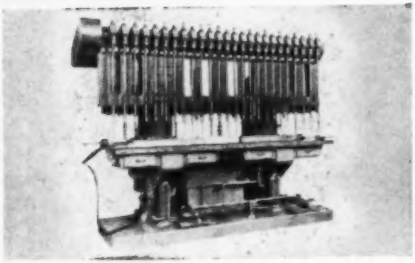
*If you already use WOOD-LOK you will continue to receive your present WOOD-LOK until we are instructed to change to WOOD-LOK 3026.



STYLE D-200

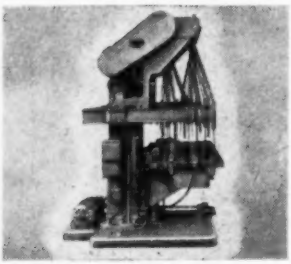


STYLE CCH

ROOT Boring Machinery

A Few of our 33 Different Wood Boring Machines . . .

STYLE G-250



STYLE CXH

STYLE D-150

ROOT machines are used for all types of single and multiple spindle boring. A few representative models from our extensive line are shown above. If you do not see a machine for your needs, write for our catalog.

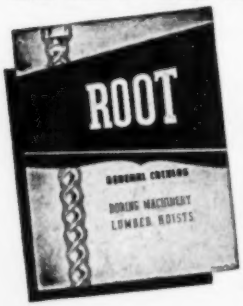
Style CCH is a large multiple spindle hydraulic feed machine for boring as many as 44 holes at one time in stock 12 feet long. A labor-saving machine for makers of agricultural implements, ladders, and other work requiring long stock.

Style D-200 is a highly developed machine for diversified boring found in furniture factories. Hydraulic spindle feed, geared-head individually motorized spindles, and automatic adjustable work clamps are a few of the features found on this widely used machine.

Style CXH is a flexible machine with universally adjustable spindles and stepless hydraulic feed. It has a 22" crossline spindle adjustment and a 4 to 6-foot boring length. Holes in a straight line or irregularly spaced patterns can be bored productively with a high degree of accuracy.

Style D-150 Radial Borer is a foot and hand-feed machine with more capacity than existing two spindle machines. Twenty-four-inch spindle-spread geared-head motorized spindles that are fully adjustable are a few of the many features of this borer. A perfect machine for the shop that does not need automatic power-feed machine equipment.

Style G-250 Boring and Mortising Machine is a foot feed machine of the general utility type. Powerful 3 h.p. 2 speed motor for large hole boring and mortising. Other features include table with universal tilt, two leverage points for light and heavy boring, totally enclosed motor, chip blower, spindle in head construction. Mortising chisel interchangeable with boring chuck. Many other features described in free bulletin on this machine.



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Each of these adhesives excels in bonding applications which include prefabricated housing, television cabinets, water craft (from minesweepers to pleasure craft), barn rafters, aircraft, crossarms for the support of high-tension lines, etc.

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Pittsburgh 19, Pennsylvania
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Name.....

Company.....

City.....State.....

KOPPERS COMPANY, INC.
Chemical Division, Koppers Building, Pittsburgh 19, Pennsylvania

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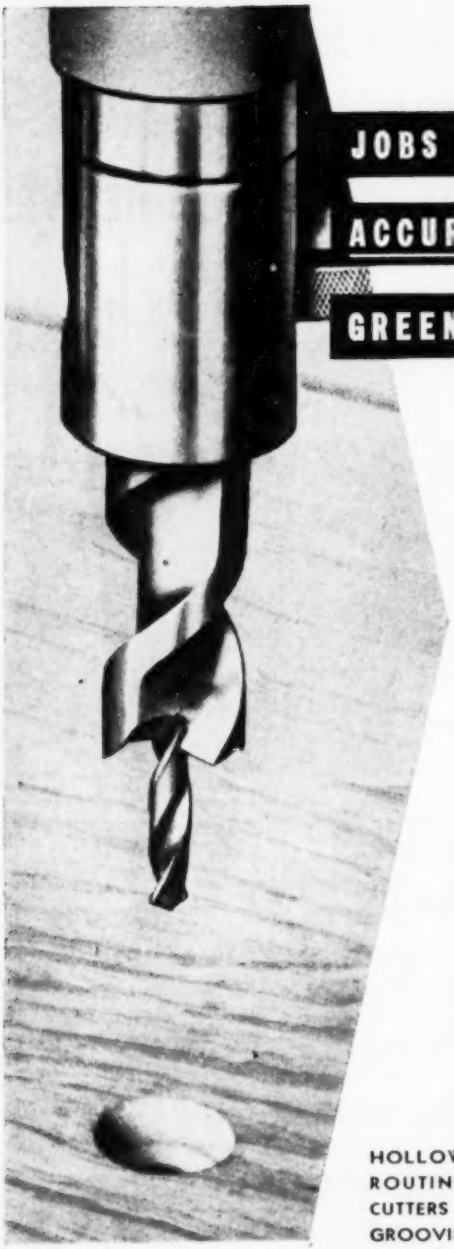
PENACOLITE® RESORCINOL ADHESIVES

® *The original resorcinol, waterproof, room-temperature-setting adhesives*



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Ask for free *Boring Chart for Wood Screws . . . simplifies tool selection*

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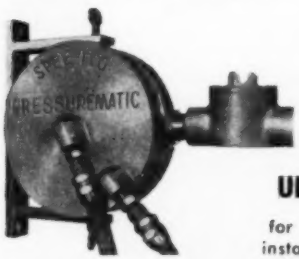

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Don't take our word for it ! !

READ WHAT THIS USER HAS TO SAY ABOUT C. O. PORTER MACHINERY

S. R. HUNG[illegible]

[illegible], TENNESSEE

May 13, 1952

C. O. Porter Machinery Co.
668 Front Ave., N. W.
Grand Rapids 4, Michigan

Gentlemen:

When we recently expanded our plant in Memphis, Tennessee, at which time we doubled our production facilities, we had the problem of equipping our mill room with the latest in high speed production wood working machinery. We kept two factors in mind; quality of machine work required and continuous high speed production. We were very careful in the selection of our machinery and spent much time on this problem.

We are happy to say that we chose several of your machines for key spots in our plant. We are presently using a Porter Hydra-Cut Saw, two Porter Routers and a Porter Shaper. To date we have had excellent results with these machines and are highly pleased with their performance. We have not regretted our choice and wish to commend you highly on the quality of your product.

Yours very truly,

S. R. HUNGERFORD COMPANY, INC.

J. A. Jaquish
Vice President, Assistant Superintendent of Production

JAJ:jm

Hungerford
Memphis

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The Porter 43-20J Hydracut Saw
Just position the lumber against the adjustable cut-off stops and press the foot control. The saw does the rest. Cuts worker fatigue, speeds production.

The Porter 612 Router
Fast, efficient, with power to spare. Like all Porter machines the Porter Router will take heavier cuts and require less adjusting.

The Porter Double Spindle Shaper
The extra speed, capacity and strength of the Porter Shaper helps increase production and cuts costs for woodworking plants throughout the United States.

Write for details on the advantages of Porter machinery in your plant.

Dividend Designed by **PORTER**

C. O. PORTER MACHINERY CO.

668 Front Ave., N. W. Grand Rapids 4, Michigan

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Famous furniture makers nowadays know that sharp, fast-cutting "Wetordry" is an essential furniture-finishing tool. It's *the original waterproof sandpaper* . . . the standard of the industry the world over. Gives your fine furniture the best possible finish —lustrous, smooth, beautiful. Always insist on "Wetordry"® Brand. For complete information, send for booklet "3M System of Furniture Finishing".

The final finish mirrors all the previous operations

3M COMPANY

Illustration:
Artist's conception of Thomas Sheraton

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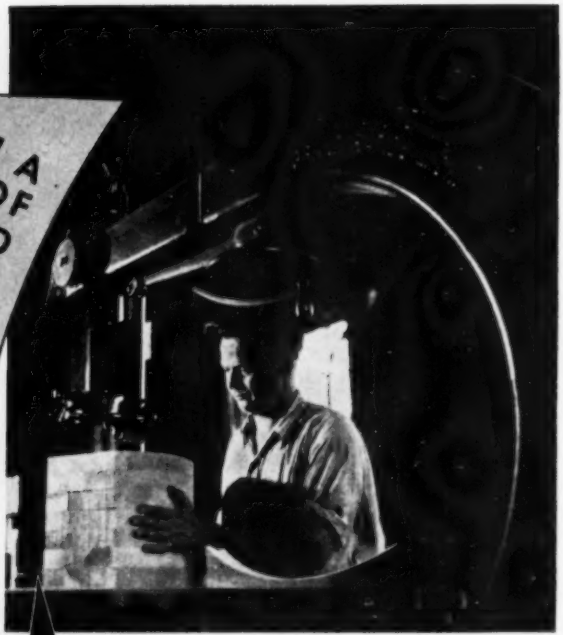
EVEN IN A STACK OF HARDWOOD LIKE THIS— THE BLADE SLIPS THROUGH AS SMOOTHLY AND EASILY AS THOUGH IT WERE BUTTER



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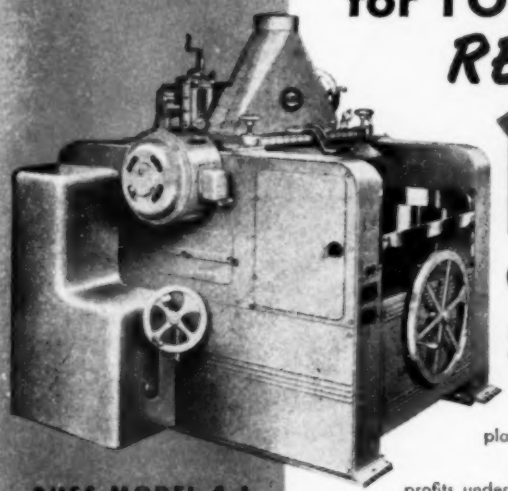

BUSS MODEL 4-L

Buss Model 4L, 24" to 30" x 8" Single Surface Cabinet Planer. The line contains single and double surface types to suit every production set-up, including the surfacing of rough lumber.

For far-sighted management that is planning and retooling to assure a price advantage for its products and normal profits under highly competitive conditions, replacement of older planers with modern-to-the-minute BUSS Cabinet Surfacers constitutes one of the best equipment investments that can be made.

These machines give you finest finished planing at three to four times the speed of older machines . . . cut set-up and change-over time as much as 60% . . . provide for grinding and jointing knives with perfect accuracy in just a fraction of the time formerly required, and incorporate numerous exclusive features that guarantee years of continuous, uninterrupted service with almost negligible amount of maintenance. Consult us on your planing requirements. There's a BUSS Cabinet Surfacer to exactly fit your production set-up. Write for descriptive bulletins.

PRECISION BUSS PLANERS

BUSS
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MACHINE WORKS

PLANER SPECIALISTS EXCLUSIVELY

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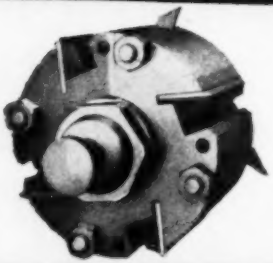
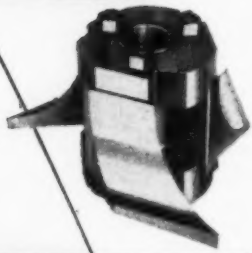
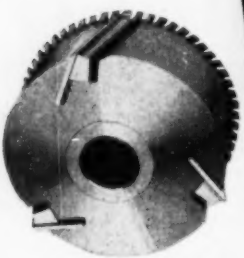
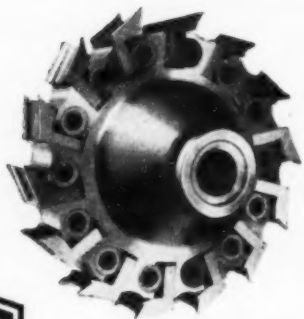




HEADS...

Here you see a few Ekstrom, Carlson cutterheads — typical of the different types and sizes available. ECCo heads are accurately made and carefully finished, to give consistent performance on the job. For uniform and reliable results, be sure to order EKSTROM, CARLSON cutterheads.





ECCO

MACHINERY AND TOOLS SINCE 1904

EKSTROM, CARLSON & CO., Dept. W-9 1400 Railroad Ave., Rockford, Ill.

DO YOU BELONG ?

From time to time I attend the meetings of various groups and organizations in our woodworking industry. Inevitably I come away from these meetings with the feeling that a comparatively few are giving time, money and forethought to fighting the battles of, and accomplish beneficial things for, their entire group.

I was present at a meeting of the Hardwood Plywood Institute held at Memphis, October 15 and 16. My reaction to this meeting was as I have described it, although their membership does represent a larger percentage of manufacturers than usual.

To give you friends in the hardwood plywood manufacturing business an idea as to why you should belong to this organization and why the woodworking industry generally should be interested, here are a few of several things that took place at the meeting.

Changes were made in grading rules in order to simplify and clarify them so as to eliminate any possible misunderstanding as to their meaning. The grades listed were Custom, Sound, Utility and Reject.

The institute put into motion an aggressive effort to protect American hardwood plywood against the inroads of low priced, imported competitive products.

They launched a well-conceived, well-directed two-fisted publicity campaign to fight for their share of the plywood business. Informative and educational material will be released regularly to the radio stations, newspapers, consumer publications and trade papers. They hope by these means to build up manufacturer and consumer interest in hardwood plywood.

To carry on the foregoing and the many other activities in which they are engaged justifies the individual cooperation and financial backing of every hardwood plywood manufacturer. All of you will most certainly benefit, both directly and indirectly, from the splendid work of this organization. As a matter of fact, carrying out their publicity plans will be doing a great deal to help the entire woodworking industry.

This organization, and many others within our industry, deserves both your personal and monetary support. Join the one identified with your particular work, do your share to promote your business, don't leave it all up to the other fellow!

And don't forget, whenever you can, BUY WOOD PRODUCTS!

Ned Bailey

Editor-in-Chief

Hand Stacking Is Waste!

Moore Roller Stacker at Edens-Birch Lbr. Co., Corrigan, Texas, making up kiln loads of Southern Pine with regular three-man crew.

POWER HANDLE lumber the modern Moore Way — by courses and loads

A Moore Stacker for:

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Solid or stickered packages
Boards stacked tight edge-to-edge or spaced for air-drying

Pine or hardwoods—green or air-dried
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For boards of uniform or random length or width—edged or unedged (bark)

Let us show how many of these cost saving advantages can be utilized by you now. Write today for information.

MOORE DRY KILN COMPANY

Oldest and Largest Manufacturers of Dry Kilns and Veneer Dryers

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Comments from THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

Transmutation of NPA to Business Defense Service Administration took place early in October. Charles F. Honeywell was appointed administrator. NPA's container and packaging division was carried over to BDSA practically without change. The duties and personnel are the same. During the month the same shifts will occur in regard to other divisions and agencies having to do with wood and wood-working products. Over 25 industry divisions will be embraced by BDSA, and come directly under three assistant administrators. Charles A. Lewis heads container and packing division. His name has been known to industry members for 12 years, since the beginning of World War II. Most recently he was chief of NPA's container and packaging division.

Lewis is an estimable member of Federal Government's Bureacracy. He is what used to be known as a career official. These men—and women—are prepared within the bureaus for each successive step, as government officials. They form the permanent government which is here come hell or high water. They are thoroughly trained in the techniques of government procedures and do a throughly competent job as government officials.

Among the announced objectives and aims of the new agency is the preservation of the nucleus of an organization which can rapidly be expanded in the interests of national security to administrative production and materials control. These plans, foreseeing a future emergency, paralleling the work of NPA during the Korean crisis, are closely articulated with the machinery of the Defense Department. Obviously the Defense Department has a persuasive, if not dominant, influence on these BDSA divisions. In addition it is hoped the agency will act as a voice for business within the Federal government. Secretary Weeks says the agency will "Be a listening post and sounding

board for bringing business information and business opinion on vital matters relating to government and industry to the direct attention of the Commerce Department for appropriate action." It will be wisdom for those in the woodworking industries to keep a close eye on the actions, releases and regulations which may come from BDSA and its various divisions.

Lumber and box group members recently visited Europe in a body. They reached within 300 miles of the Arctic Circle. They speak in glowing terms of hospitality in Sweden and elsewhere. They found Sweden depends upon its forests much in the same way as Nebraska and Kansas depend on corn, wheat and livestock. The chief career for their ambitious young people is to engage in the various occupations having to do with planting, nurturing, measuring and charting forest life, and transforming timber into wood products.

Probably the greatest jolt the tourists received was when they visted the United Kingdom. They were the guests of the United Kingdom Forestry Commission, Timber Trades Preservation and Timber Agents and Brokers Association. The stay in London included a three-hour inspection of the timber docks of the port of London where approximately 20 million feet of lumber, or timber, in various forms is in transit or storage. They found lumber unloaded from Baltic sources as well as from Russia. Square cut Japanese oak was plentiful. The shock came when the American visitors learned that the dock workers' union had sufficient influence to prevent the substitution of modern lumber-handling equipment in place of the type of handwork that has been prevalent since the year 1600. Obviously the wastefulness of using manpower solely in place of modern machinery imposed a tremendous cost penalty on all lumber shipped to the world's most important lumber import market. Of course, some of this is inherent in the conservatism of the British.

Obviously, in these days when the United States is pouring its billions into Europe for the relief of workers it might be expected that the European workers would also accept American techniques and machinery. The situation in regard to London's lumber import mechanics is a fair illustration of what we contend with in our foreign relations.

The new Hoover Commission is expected to make searching inquiry into the practices of Federal government in competing with private industry. One of the early investigations is expected to touch the government activities in the various processings of timber and manufacture of woodworking products. According to testimony before the Senate small business committee's subcommittee on relations with business with government, the Federal government will stiffly resist efforts to prevent its many industrial and business operations. The Defense Department's appearance in a discussion over the matter of the aluminum sweating industry's problems and difficulties revealed the policy of government. Assistant Secretary of Defense Charles S. Thomas was the chief witness for the government. He strenuously defended the government's operation on five grounds in this particular instance. He insisted that government operation of business in competition with private industry would insure total demilitarization of production of certain components;

Perkins is headquarters for HIGH FREQUENCY GLUES

The excellence of high frequency equipment for many operations is a proven fact. If you aren't getting the best possible results, it may be that you do not have the proper glue formulation. This can easily be determined through a free and unbiased investigation by the High Frequency Section of the Perkins Technical Service Division.

Since Perkins Glue Company offers five different formulations for use with high solids liquid urea resins, plus several others for use with low solids resin and powdered resins, you can be sure that the glue-catalyst offered you will be best for your operation.

Whether you now have high frequency equipment or are thinking about trying it, return the coupon below for Perkins Summary of Adhesive Combinations for perpendicular, parallel and stray field heating. It's a step in the right direction!

PERKINS GLUE COMPANY

LANSDALE, PA. • HIGH POINT, N. C. • SHAWANO, WISCONSIN
KITCHENER, ONTARIO • LA CHUTE, QUEBEC

Send us a summary of adhesive combinations for High Frequency Gluing ☐

Send us general information on the subject of High Frequency Gluing ☐

Your Name_____

Title_____

Mail to: Perkins Glue Company, Lansdale, Pa.

(PLEASE ATTACH TO YOUR LETTERHEAD)

that it would alleviate the problem of bulk storage; that it would materially reduce the need for personnel; and that it would conserve transportation facilities and expand the market for the materials involved.

Mr. Thomas gave figures showing the Navy had been operating plants in competition with private industry since 1943, and that the net increase in monetary returns were greater than those which could be obtained by private operation. He stated the Defense Department estimated that in the aluminum operation alone, Navy and Air Force would save for government between $300,000 and $400,000 annually. The assistant secretary made much of the fact that many internal security regulations would have to be studied to make contracting with private industry more feasible. Senator Long of Louisiana and Senator Ferguson of Michigan indicated they were not satisfied with the argument presented by the Defense Department. The committee instructed its staff to continue a vigorous study.

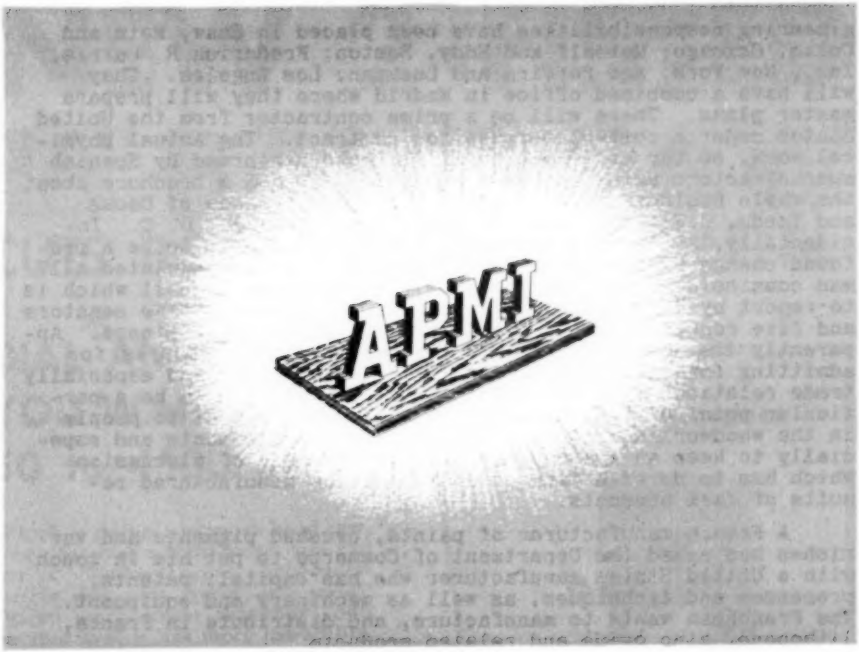
Abolition of seven Air Force procurement districts should have no effect upon business, especially upon small business according to the promise made to Senator Edward J. Thye, chairman of the Senate Small Business Committee, by Secretary of the Air Force Harold E. Talbott. Talbott told Thye "The reorganization will have practically no effect upon activities of regional offices and small business in purchasing offices—'operation pacemaker'—will be completely unaffected."

Small Business Administrator William G. Mitchell has made various addresses lately in New England, and elsewhere. On September 29 he announced SBA is ready to accept applications for loans, and that on loans granted it will charge a flat 6% interest rate.

There is word that a tabernacle built of wood may be erected in Washington for Evangelist Billy Graham. It is to be patterned after the mammoth auditorium located on the Michigan State fair grounds. The Michigan timber engineering marvel accommodates over 12,000 people, covers one and three-quarter acres and is free of sight-impeding posts by reason of the use of prefabricated wood arch trusses supporting the roof. Sixty columns support the trusses but only 26 run through the middle of the building; the others are set outside of the walls. They tell us their structure of 100,000 board feet of lumber used just for outside wall framing, roof joists and bridging and other lumber, including two carloads of Douglas fir plywood, totaled enough wood to build a community of 35 average houses.

NMLA reports one baby is born in the United States every 8 seconds, at the same time at least 128 tree seedlings are planted. It tells us also our present standing timber volume is equivalent to 160 million 6-room houses, or one house for every man, woman and child in the United States.

The agreement between the United States and Spain, in September, arranges for the expenditure of very considerable funds for the building of bases and other sites, also for the rehabilitation and modernization of many Spanish military facilities. This will involve huge quantities of American lumber, and products of woodworking industries. The architectural en-



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gineering responsibilities have been placed in Shaw, Metz and Dolio, Chicago; Metcalf and Eddy, Boston; Frederick R. Harris, Inc., New York; and Pereira and Luckman, Los Angeles. They will have a combined office in Madrid where they will prepare master plans. There will be a prime contractor from the United States under a cost-plus-fixed-fee contract. The actual physical work, so far as is possible, is to be performed by Spanish subcontractors using native labor. You can get a brochure about the whole business by writing to the Chief, Bureau of Docks and Yards, U.S. Department of Navy, Washington 25, D. C. Incidentally, if the President has his way, there is to be a profound change in foreign economic policy. He has appointed a 17 man commission under the leadership of Clarence Randall which is to report by March, 1954. The commission includes five senators and five representatives and members of labor and business. Apparently the Reciprocal Trade Agreement Act; procedures for admitting foreign goods through American customs; and especially trade relations with the British, and tariffs are to be a particular point of the inquiry. It will be important to people in the woodworking industry to watch the developments and especially to keep an eye on the point in the area of discussion which has to do with farm products and the manufactured results of farm products.

A French manufacturer of paints, crushed pigments and varnishes has asked the Department of Commerce to put him in touch with a United States manufacturer who has capital, patents, processes and techniques, as well as machinery and equipment. The Frenchman wants to manufacture, and distribute in France, lithopone, zinc oxide and related products.

The name of the firm is France-Broyages, having two plants in Perigueux and La Teste. The first plant has a total area of 360 square meters under cover; the other, 450 meters. Eighteen to 25 workers are employed at present. Those interested should direct their inquiries to 18 Rue Du Bac, Perigueux, Dordogne, France.

Down in Chile the National Foreign Trade Council is producing a wood product plant to cost $550,000, capable of making a million square meters of pressed wood annually. Unless an American plant can beat them to it, the machinery is to be bought in Germany. The plant is to be built in Monte Aguila. Most of the product is to be used in the construction of low-cost housing projects which are being undertaken by various Chilean government bureaus.

An interesting finance item arranged by the International Civilian Aviation Organization, which of course is chiefly supported by the United States, is planned under the auspices of the International Bank for Reconstruction and Development to finance construction of buildings to house radio transmitter equipment for north Atlantic air traffic. It involves about $6 million. The funds will be disbursed through the Iceland Bank of Development. Great quantities of lumber and wood products will be required. Whether American products will be used is not clear. The interesting fact is that Iceland has absolutely no forests. It must import every stick or plank, every board foot of lumber that it uses.

NEW 2-FISTED 16" BAND SAW

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Your factory-trained Walker-Turner distributor will give you all the information on this new multi-use variable speed saw. Or, the new single speed model for woodworking only. Ask your distributor or mail coupon below.

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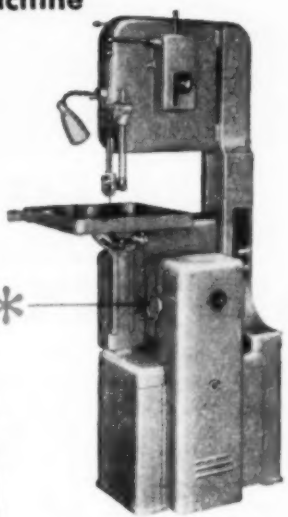

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Pointed PARAGRAPHS

Average life of living room furniture was formerly rated at 18 years and 4 months. TV is cutting that time in half. This is only one of the many effects that TV has had on America's living habits.

Latest living cost index shows a slight rise—just a fraction of 1% above the previous month. However, it does make a "new high" in living costs. Next year these costs should be down a little. Business for next year continues to look good. The biggest toy season ever is expected by merchants this Christmas.

Two hospitals in New York have recently undergone renovations including the redecoration of walls in an attempt to capture some of the warming atmosphere and comfort of the home. Wood paneling was used in many of the main rooms.

Wood ladders continue to gain in popularity. The Chicago Fire Department's request for wooden ladders was presented earlier in WOOD WORKING DIGEST. Now the NLMA has issued a news sheet on advantages of the wooden ladder. Some of these include: easier to repair rungs, does not conduct electricity, is rigid, won't corrode or warp under extreme heat nor snap under extreme cold.

National Woodwork Manufacturers Association has announced the completion of the final draft of the proposed commercial standard for hollow core hardwood flush doors. Headquarters of the association is 332 S. Michigan Ave., Chicago, Ill.

The southern lumber industry has topped its previous reforestation records with the planting of 65,907,000 seedlings during the 1952-53 season.

Christy A. Wilken, vice-president of engineering and research, Rockwell Manufacturing Co., made a recent tour of more than 50 industrial plants

in 11 western European nations. In regard to our own industry he said, "I believe our woodworking industry is slightly ahead of the European engineering and design—mainly because our larger market permits more automatic machinery and more jigs and fixtures to produce them. However, because of the destruction caused by World War II, many European plants have been completely rebuilt with American aid and therefore have generally better machine tools than we have at present."

Miles Colean, Washington's leading building economist, writing exclusively for "House & Home," predicts that a million new homes will be built in the U.S. during 1954. This would mean a 10% drop from the estimated '53 figure. However, availability of mortgage funds may bring the figure even higher.

The Prefabricated Home Manufacturers' Institute tells us that every fifth family buying a new home this year in Columbus, Ohio, will select a prefabricated house. The prefabricated homes are selling from $9,500 to $35,000.

The fall meeting of the Great Lakes Section of the Forest Products Research Society has as its theme "Is High Frequency For Me?" Those attending the meeting will be presented with copies of the WOOD WORKING DIGEST booklet "Electronic Gluing." Those interested in this subject will enjoy reading another excellent article by Paul H. Graham "Shielding Electronic Equipment" found on page 51 of this issue.

There is, unfortunately, an increasing tendency to spend more and more thought on our leisure moments and hobbies. These are important, but let us not forget that America did not "just happen." Hard work has made us what we are today. To remain where we are as a nation requires hard work on the part of all of us. People and companies who go places are the ones who have the foresight to see their opportunities and the initiative to do something about it. Read the editorial to see what one section of our industry is doing.

We are told that 1953 furniture sales may hit a new high . . . if present rates continue. This year's figure could top the 1950 total by 200 million, members of the National Association of Furniture Manufacturers predicted at their recent meeting.

Cool weather spread a fungus through many of New York state's white oaks and sycamores. The disease, anthracnose, is said to have been encouraged by a moist, chilly spring.

A new meter gauges water content of wood by measuring electrical conductivity. It is said to operate quickly without wiring, preparation or time waste. It can be used on veneer, chipboard, plywood, core stock, planks, etc.

"AMF DE WALT gives hour-after-hour speed and perfect accuracy!"

"In making our Myers-Lee disappearing stairways we need a machine that gives us hour-after-hour speed, plus *perfect accuracy* the first time on all dado cuts.

"That's important, because one bad cut means a whole board is wasted. We have 2 AMF De Walts set up to make 30° right and 30° left hand miter dado cuts on ladder stringers. We've found both AMF De Walts 100% dependable.

"What's more, AMF De Walt's speed fits in with the unusually fast production line we've set up. Faster production and no wasted material mean higher profits."

For speed, versatility, precision and safety in your operations, see your AMF De Walt® dealer or write us for full details.

AMF products ARE BETTER...*by design*

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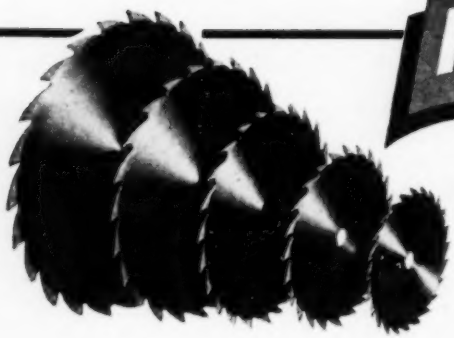
AMF DE WALT POWER SAWS

Write AMF DE WALT, DEPT. WD-53-11, LANCASTER, PA.



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Carbide Tipped SAWS

...try these important production-builders *in your own plant*

REDCO Rip and Cross Cut Carbide Tipped Saws cut cleaner, faster, longer to effectively boost your high-quality production. These Redco Saws have heavier cemented carbide teeth, precision ground for longer service life. Each tooth is correctly brazed to the blade and pressure tested to 15,000 PSI. Accurate tensioning, gullet design, clearance and cutting angles all result in smoother running and cutting saws. These saws can be sharpened on a Redco Grinder or sent to the plant for 24-hour, "in-out" sharpening service.

Write for complete information on these important Redco production-builders. You'll find it pays to use these Redco Saws that were developed by woodworking men . . . and performance-proved in their own plants.

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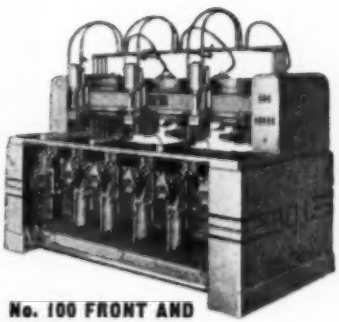

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THE BELL MACHINE COMPANY
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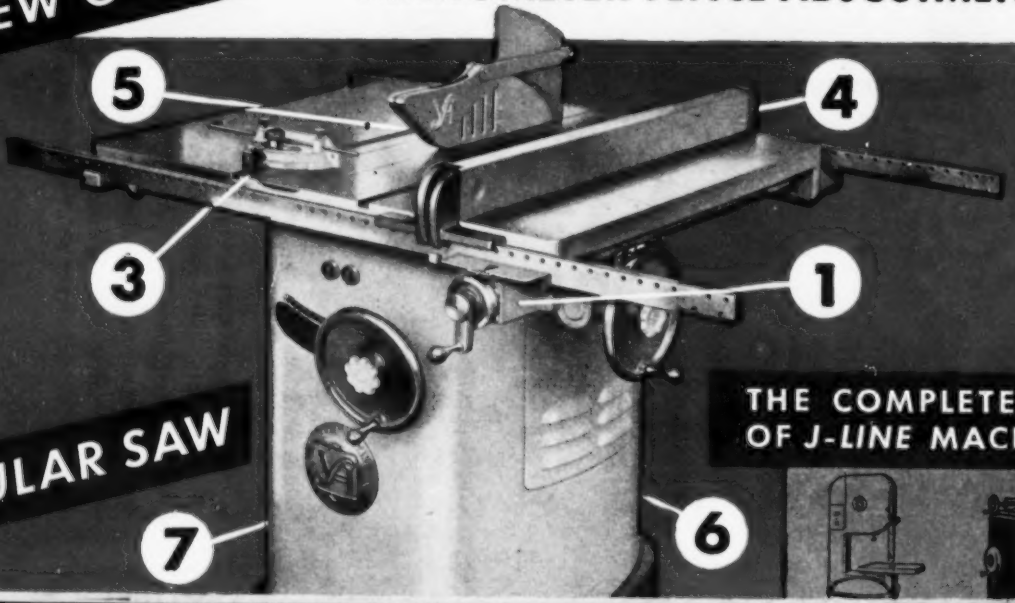
Yates-American Announces a NEW SAW!

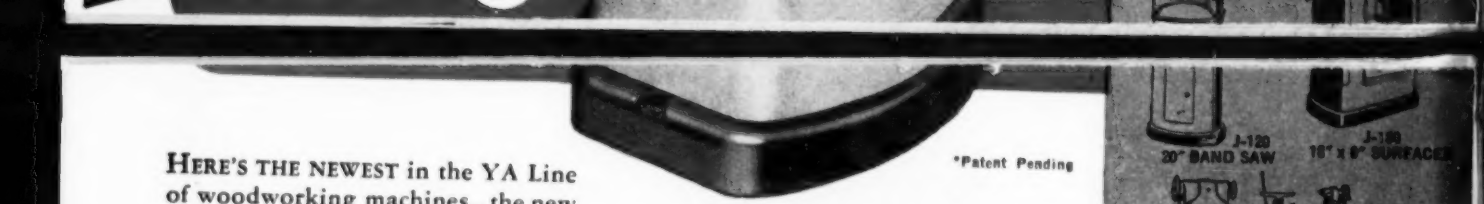
WITH "ZERO-IN" POSITIVE ALIGNMENT MICROMETER FENCE ADJUSTMENT

...THE NEW G-110



10" CIRCULAR SAW

THE COMPLETE LINE OF *J-LINE* MACHINES



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HERE'S THE NEWEST in the YA Line of woodworking machines...the new G-110 10" Circular Saw with the *finest* and *most accurate* control for fence adjustment. It's a beauty, too...has the same modern design as the popular Yates-American J-Line.

Features Include: 1. *"Zero-In" Micrometer Positive Alignment Fence Adjustment* for fast, accurate cuts.* **2.** *Fence Rail Extensions* (not illustrated) permit the easy handling of large stock (Furnished as extra equipment). **3.** *Grooved Miter Gauge Tongue*...can be extended well beyond edge of table. ***4.** *Mobile Rip Fence*...readily removable . . . permits transferring fence to either side of saw without sliding it off the ends of the rails. **5.** *Full* 3⅛" *cut.* **6.** *Dust Removal Chute* for convenient dust disposal. **7.** *Fully Powered* 3 H. P. maximum.

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This press fits into both quantity and quality schedules, gluing solid-type furniture as well as core stock.

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Raybond also makes Edge-Banding Presses, Panel-on-Frame Presses, Box Presses, Wood Bonding Guns, Laminated Veneer Presses, Special Jigs and Assemblies.

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SHIELDING ELECTRONIC EQUIPMENT

By Paul H. Graham

SHIELDING of electronic gluing equipment is based upon two important considerations: prevention of excessive high frequency radiation and safety of the operator. Federal Communications Commission rules for this type of equipment specify that radiated energy be limited to a low value of 10 microvolts per meter at one mile, or, that radiation from power line must be less than 10 microvolts per meter, one mile from the equipment and 50 feet from the line.

Radiation from electronic equipment does not always come from the equipment itself but may be the result of feed back of high frequency energy into power lines connected to the unit, to cause the power line to act as an antenna and causing radiation to be picked up by circuits and equipment in no way associated with the radiation producing equipment. Unless high frequency energy is confined to proper circuits radiation into stray paths can produce troublesome and undesirable effects, both local and remote.

Even when electronic equipment has been shielded, radiation from high frequency leaks may be caused by faults in the shield, cable, louvers, doors or other openings, or in the cabinet. High frequency currents have been known to circulate in control devices to impair or destroy their normal functions. Electrodes used in electronic gluing applications are usually large and may function as a good radiation antenna unless properly shielded. The use of auxiliary circuits without filters have also been known to produce excessive radiation.

High voltages used on electronic gluing equipment are less dangerous than those of conventional alternating current output in that high frequency does not produce shock. Bodily contact with high frequency of high value, however, can result in most severe burns. Radiation is often of such magnitude as to make metal parts alive and cause the operator or anyone else who comes into contact with them to suffer painful burns. Even grounded water pipes can be made alive to a burning point. Dangerous potentials which can cause burns may also be set up between equipment connections.

The engineering "know-how" required to design, place and shield electronic gluing equipment components has been acquired by manufacturers of electronic equipment in servicing many similar installations. Shielding does not have to be difficult or expensive but design and application of adequate shielding requires a special technique acquired only through experience. Where commercial electronic gluing equipment is purchased in package form, the generator manufacturer usually works with the press or assembly unit manufacturer in the development

of the complete equipment. This equipment is then type tested to make sure that radiation complies with FCC regulations and it is so certified.

Most of the shielding problems which will be mentioned have been corrected in new electronic equipment which has been certified by the manufacturer to conform with FCC rules governing the particular type and application. Although electronic gluing equipment may be properly shielded at its original installation to conform to all requirements, this cannot be assumed to be its permanent condition. Any equipment is bound to deteriorate in service, in spite of the best workmanship and materials, and conditions will develop which can increase radiation to a point of non-conformity and interference.

It is important that the equipment be always operated within its prescribed ratings of power, electrode voltage and frequency. Furthermore, all shields, doors, panels, etc. should always be in place when the equipment is in operation. To insure proper performance of all shielding devices, a regular maintenance schedule should be followed to check shields for breaks, corroded joints, broken or corroded ground connections, loosened fasteners or poorly contacting doors or screens.

One of the most common causes of excessive radiation is high frequency leakage due to corrosion of metal parts of the shield. Opening contacts and bonding strips should be cleaned immediately upon finding evidence of corrosion. Fasteners used to join these surfaces, such as latches, screws and other devices, should be checked and tightened periodically. Many manufacturers of electronic equipment protect metal parts by special processing, plating or painting against oxidation and corrosion in such a manner that surface electrical resistivity is not affected. Electronic gluing equipment generally is subject to less radiation trouble the lower its installation as radiation basically is a function of the unit above the earth's surface, increasing in proportion to height. The preferred location for equipment of this type is on the first floor or in the basement of a building, making the installation as far as possible from metallic blower pipes, ducts and flues, steam pipes or any power circuits or equipment which might pick up high frequency energy by capacitive or inductive coupling.

In cases of local interference with radio and television in immediate vicinity of the plant where the electronic equipment is known to be operating within FCC regulation limits, extreme and expensive shielding may be avoided by installing wave traps or similar special devices in the radio and television sets affected. Even when electronic equipment is operating within FCC standards, all reports of interference must be investigated and excessive radiation causing interference must be controlled.

Since most electronic generators are now specifically designed and constructed to meet FCC regulations, shielding of the complete electronic gluing equipment may be provided by a shield chamber of double-walled metallic screen, or the work handling equipment only may be enclosed in a shield to eliminate radiation from high frequency leakage. Press units are usually completely enclosed except for specially designed openings and access openings are interlocked with the generator to cut off high voltages when the operator must approach the electrodes. This shielding generally surrounds the load electrodes and all associated circuits.

The generator is usually housed in a metal case, which provides effective electrostatic and electromagnetic shielding, and doors or other openings are

equipped with continuous spring contact to minimize radiation. Equipment components are often placed upon a large metal sheet in a compact installation, with short-direct connections between the units. High frequency switches are also completely enclosed and shielded and have safety interlock and grounding devices. In many installations telescopic shielding gates located about the press have switches installed so that the opening of the gate opens the plate circuit of the output tube and automatically shuts off the power. Built-in timing devices to shut off power at a predetermined time are standard equipment for many electronic gluing installations.

Shielding can conceivably be properly designed but improperly constructed or made of high surface reaction and high loss materials. Even when proper materials are used and thickness and conductivity of the shield are adequate, poor contact about openings will permit radiation. The chief sources of radiation in this connection are stray currents along the edges of the frame and over surfaces of shield enclosures surrounding the equipment. Extraneous current circulating loops are often created by needless ground connections. Proper grounding of electronic equipment and shields to reduce radiation is best accomplished by the use of a single ground connected to a piece of equipment—not many applied to various parts of the shield.

If shielding is properly done, the chief requirement for grounding is for safety purposes. An A.I.E.E. recommendation states that a standard Underwriters' safety ground may be used for this purpose or a conduit return to the main entrance switch may be used as a 60-cycle or d-c ground. Connecting equipment to ground often shows no improvement, as when electronic equipment is required to be installed on the upper floors of a building, and in some cases where sufficient radiation resistance is produced may even increase interference instead of reducing it. Where a single ground connection is made to the equipment in some installations, it is sometimes considered advisable to have this ground further connected to other grounds or grounded pipes to insure that the system will be well grounded.

In electronic pressing operations leads are sometimes made to run parallel to each other and as close together as practicable, often using two ground leads—one on each side of the hot lead —to help minimize radiation. As a precautionary measure against radiation potentials metal pipes are used for grounding, water cooling, power supply or similar connections are brought into the electronic installation at a single point where they are bonded to short circuit high frequency currents and prevent conduction from the inside to the outside of the shield. Where possible, these connections are made to approach from underground.

Exposed conductors of high frequency current and differences of potential are major sources of radiation requiring adequate shielding and bonding. Louvers, doors, panels, windows or other openings must be screened, with the edges of the screening securely bonded to the main shield. This may be done by brazing or welding although closely - spaced screw fastenings will sometimes suffice to connect screen sections. Shielding conductivity and corrosion resistance of joints is often improved by plating in commercially constructed units. It is important that metal used for shielding be of sufficient thickness and have adequate surface resistance and reactance properties to prevent current penetration.

Various materials are used for shield construction in wire mesh screen or

sheet metal form. Sheet metal shields are usually fabricated from aluminum, copper or copper-plated steel or the shielding may be a wire mesh housing of aluminum, bronze or copper screening (usually 16 mesh). In some installations where screening is used, a double-wall shield may be required, in which one housing is used inside another to bring radiation down to the required level. Sometimes the use of a partial internal shield will suffice. This treatment has been used where electrodes are large and excessive shield currents are setup by their stray capacities. Tank currents are prevented from circulating in the walls by attaching tuned circuits inside the shield to it at a single point.

Shielding faults which contribute to radiation are poor joints, excessive penetration through iron wire, screen mesh too large, shield size too small, unscreened openings, or high shield currents because of undue proximity of internal circuits. General shielding recommendations stipulate that electrodes should never be spaced less than 1 foot from any part of the shield for powers in excess of 5 Kw. output and should be proportionately less for lower powers. It is not considered good practice to protect such internal components as control wires, low frequency and d-c supply circuits, meters or relays, which are not associated with generating circuits from high frequency currents. A separate internal shield is often used to simplify shielding and filtering of the generator, containing only high frequency circuits.

Many times it is required only to improve shielding already provided with the equipment, using wire mesh screen shielding over ventilated openings, as when the unit is enclosed in a metal cabinet, and providing electrical contacting or overlapping surfaces on doors to prevent radiation. Access doors, panels and other openings found in shield constructions are usually of special design and construction. Doors either carry sufficient overlap or make electrical contact to the main shield by contacting fingers or other devices around their periphery when closed to prevent radiation leaks. Interlocks are also provided to prevent operation of the equipment when opened for reason of safety. It is important the doors be kept free of paint, dirt or corrosion!

While various joining methods may be used, joints in metal shielding materials are usually made by interlocking folded ends and fastening by brazing, welding or the use of screws. The popular spring-like bonding strips used for overlapping door constructions around their periphery are usually made of beryllium copper or phosphor bronze but resilient metal mesh or metallic weather stripping (usually brass or bronze) may be used.

When the generator requires transmission lines, the shield generally includes a shielded coaxial transmission line from the generator to the press, as short as possible. This transmission line may be of concentric or shielded duct type, with the outer conductor fabricated of copper, copper-plated steel or aluminum. It is generally run between units along the metal base of the installation to prevent large, radiating loop circuits. It is important that the outer conductor be continuous and where required, joints or access covers are fastened by screws spaced not more than 4 inches apart. A solid metal conduit or flexible metallic braid is considered superior to BX cable for this application.

A power line filter is often incorporated in the generator for use in wire circuits which eventually reach open space where they can radiate energy. The filter is installed in series with the power line and is of proper capacitance

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Increase Production with

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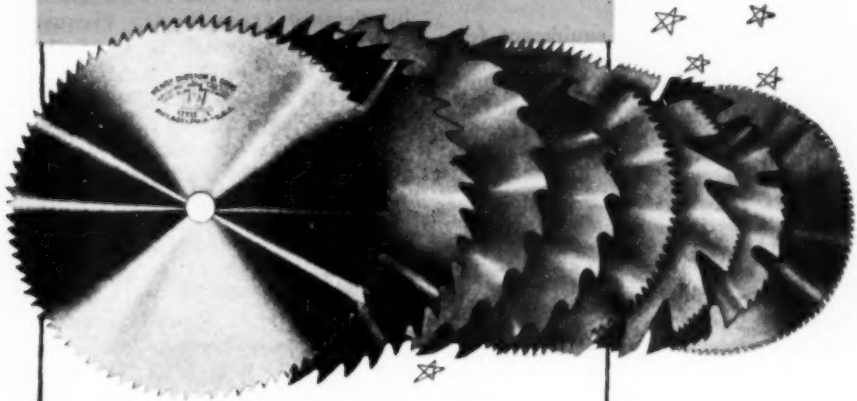

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and inductance to block the flow of electronic energy within the range of frequency required. A shielded transformer is sometimes used in place of the line filter with a grounded (electrostatic) shield between primary and secondary, in series with a wire circuit. Metal conduit is usually used throughout where internal control wiring is required and the main power supply to the equipment usually passes through a line filter before leaving the conduit.

In electronic gluing equipment featuring conveyor feed, where openings must be provided, an electrical labyrinth is often used as a radiation barrier, arranged in the form of an external or internal metallic tunnel or vestibule whose length and area are designed to suppress radiation by function of the electrical wave length of the frequency used. The external or internal tunnel or vestibule is provided with width or height, whichever is larger, not exceeding approximately one-third the wave length of the highest frequency to be suppressed, and with a length at least equal to the larger of the width or height dimensions.

Although electronic gluing equipment may have been thoroughly checked after original installation and shielding, it should still be checked periodically for high frequency leaks that cause radiation. Various types of instruments are used for this purpose, including interference locators, field intensity and radio noise meters, and probes equipped with rod antennas or direction-finding loop antennas. Portable radio receivers are sometimes used to track down sources of radiation by following the direction in which the signal increases.

These tests are usually made with tuning conditions and voltages the same as used for normal operation. When it is required to operate with reduced power for any reason, due care is taken that all sources of radiation retain the same relative amplitude and phase with respect to each other and a conversion factor is applied to approximate normal conditions.

One of the more efficient instruments for checking radiation leaks is a simple loop probe using shielded inductive coupling which is detailed and described in the publication "Recommended Practices for Minimization of Interference from Radio Frequency Heating Equipment." It is available from the American Institute of Electrical Engineers, 33 West 39th St., New York 18, N.Y. This loop probe not only indicates location of radiation leaks, but also permits determination of relative amounts of the leak.

As described in this report this sensitive probe operates with a pick-up loop and when brought close to the high frequency leak in shield or filtering, a voltage is transmitted to a tuned circuit and thence to a rectifier circuit, consisting of a crystal, a filter and a microammeter. The rectifier converts the high frequency current to d-c current for deflecting the meter. The tuned circuit functions both as a variable sensitivity and selectivity control. The entire unit is shielded to minimize body capacity effects.

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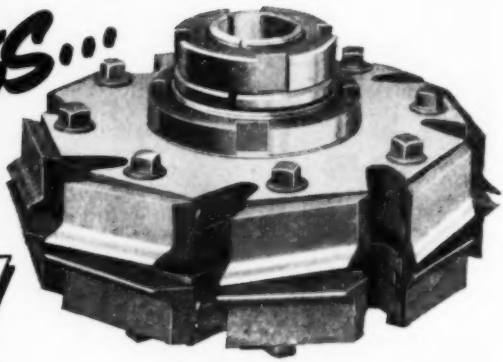

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Part 2

Saving Material By Core Repair

By H. H. Connelly

IT IS the primary function of the straight line rip saw to prepare the random width stock for gluing. This is accomplished by removing the defects, straightening the stock and in many plants to leave a joint suitable for gluing.

Close study will reveal two predominating errors that lead to useless waste at this operation. First, removing too wide a sliver when edging the board. We are aware of the necessity of keeping the saw buried in wood but this sliver should be kept to the minimum.

Check your wood box. If you have slivers that measure heavier than 1/16", you are losing wood, and need an operator with Scotch (not the drinking kind) in his blood. An operator ripping 1,000 linear feet per hour with an excess sliver width of 1/4" loses, wastefully, 20 feet of lumber. Multiply this by his production for a week and you will find enough lumber going to the fire box to raise your temperature.

Second, check the amount of unnecessary material removed with the defects. In one plant it was observed that the operators were removing the knots and defects by parallel ripping. Rip all core stock at an angle, if necessary, to remove a defect. You can increase the yield by 10%.

A third significant saving of material can be made by a jump saw installation in combination with the ripping. In a setup of this type, the board is ripped for gluing and the defect near the end left in the piece: the jump saw cuts off the defect and reduces the piece to a shorter panel.

Material Saving Through Core Production and Repair

If you are manufacturing furniture of a solid line, your field of activity for paring the waste factor is limited.

However, in order to manufacture a line of solid furniture, thousands of feet of good lumber, adequately sound enough for a quality core are thrown to the hog. This applies even to high grade lumber, which because of an occasional knot length, or sound defect is prohibitive for solid construction.

Why not manufacture a line of veneered items in combination with the solid; or produce cores for other concerns that do? When this was put into practice in one furniture factory the waste dropped 15%.

Repairing Cores Can Save Material

Is it profitable to repair cores? Maybe. How efficient is your core repair operation? Are you using work-saving devices?

The answer to the first question is "Are you paying more for the labor to

Defects can be removed from a core with a smooth cutting saw tooth bit that cuts a flat bottom for plugging.

make the repairs than the value of the wood saved?" If the cost of making the repair is too difficult, return the parts to the rip saws, re-rip, glue and surface to another part.

Making sound wood repairs can be divided into three methods, round plugging, v-plugging, and routing, either of which are excellent and cost little.

Round plugging is the most common. To round plug, it is first necessary to make the plugs. Most concerns do this with a simple plug cutter obtainable in any diameter. A standard drill press is adequate for furnishing the power. The thickness of the plug will be determined by the planed thickness of the scrap from which the plugs are cut.

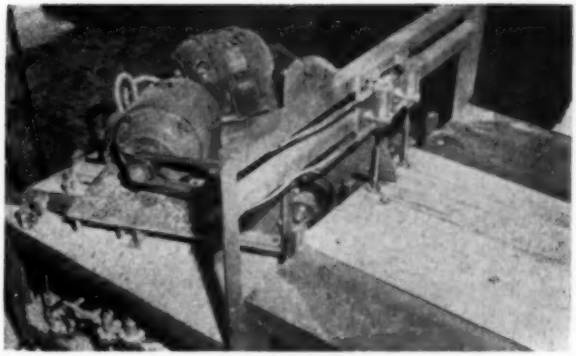
The defects are bored on a drill press, using a multi-spur drill of the same diameter, that leaves a clean flat bottom. A small amount of glue is applied to the hole and the plug driven home. Excess glue will keep the plug from going to the bottom of the hole and may cause a sunken plug after planing.

There are on the market several automatic plugging machines that do in one operation all the operations described in one cycle. One machine cuts a taper plug, bores out the defect, sprays a film of glue into the hole, positions the plug and hammers it into place. All this is done in a complete cycle of less than one minute.

End plugging cores by the v-plug method has many inescapable advantages. First there is a distinct saving in material. A core plugged from the end has the same appearance as the end grain making up the random width pieces in the core.

One concern making table tops has used this method successfully for years. Keeping the front edges free of defects was comparatively easy by selecting clear, narrow strips; but to cut long core stock without an occasional knot appearing in the end bordered on the impossible, without excessive waste in ripping. It is not unusual to make several v-plug repairs, one interlocking another, to clear up a defect too wide for one plug. The v-plugs are made ahead of the actual plugging on the same saw that is used to remove the defect. One advantage of the v-plug is found in the ease with which it is hammered into place without the necessity of cumbersome clamps.

A simple v-plugging saw can be made by any shop. In its simplest form it consists only of a saw mounted on a frame in such a manner that it can be moved into the work to a predetermined stop. On the frame a swivel table should be



Air operated v-plugging machine for repairing cores. Two saws are set at a 60° angle from each other. The core is held stationary by air clamps. When the saw is started air cylinders force each saw out and into the wood for removing the defect.

mounted to swing on a cutting angle of 60° with the work.

To operate, the core is laid on the swivel table and one side of the v is cut; the table is then moved to the opposite side and the second half of the v sawn out. In the event several connecting v-plugs are used, the first plug is glued into place and a part of the plug removed in the second sawing. This provides a soundly glued interlocking repair across the end grain of the core.

Repairing Surfaced Cores

After a core has been planed to a final thickness, you will find many discouraging defects that were not evident in the rough thickness. A poor glue joint, for one, is difficult to see until planed. Worm holes beneath the surface is another defect. Often an apparently sound knot will split out leaving a hole to be repaired.

Here we find again an application of the plugging method just described. The only difference being the cost of working down the repair to a finished level with the core surface. In repairing before planing we used the planer to do our work at the time of surfacing. Now we must add an additional operation.

One concern has worked out a very efficient straight line method for performing this task by means of a portable router, belt sanders and a dead roll conveyor. With this setup it is not unusual to clean up as many as 400 panels per hour.

One operator is used to remove the repaired panels from the stack, lay them on a conveyor for the portable routing. The router is set with the bit to cut flush with the panel surface. By sliding the machine across the core face on its base, the operator is able to machine the plug to a plane level to the core face. The part is then passed to the next operator who sands the plug clean, removes excess glue and passes the panel to an inspector.

One other method of core repair that helps relieve the ever present waste factor, and should be covered briefly at this stage, is the sliver repair. The only tool needed for this repair is a handsaw with teeth set to remove a saw kerf the thickness of the sliver. The slivers in most plants consist of waste 1/28, 1/20 or 1/10 veneer.

End checks, open joints or splits are sawn open the length of the split, glue applied to the wood and the sliver driven in. The only danger is the failure of having the saw set too wide for the sliver. A check for this is the firmness by which the sliver is driven in and the inability of the operator to pull the sliver from the repair by hand, once it

After boring out the defects, the work is plugged with round, pre-cut wooden plugs. Care should be taken not to place too much glue in the bottom of the hole or the plug will not go to the bottom.

has been driven in.

For those occasional end grain v repairs of planed cores, here is a neat idea that has been serving one furniture plant highly satisfactorily for a number of years. A small band saw is mounted in the repair section; and when the boys run across a core that needs a sound v-plug, they select a piece of cull core stock planed to the same thickness and fasten it to and above the defective spot in the core that is to be repaired. These two pieces are then band sawed together and the sound v-plug is a perfect fit for that defective portion removed. Sometimes they are in an artistic frame of mind and put a few extra curves in the side of the v, but the plug fits like the piece of a jig saw puzzle. A little glue, a few hours, and a wood clamp to hold the surfaces flush, produce an excellent repair. After the glue has set, a few light strokes with a scraper will remove the extra glue, leaving a smooth core surface.

Repairing By Portable Router And Drop Sawing

Both these types of repairs find their greatest advantages in repairing banded cores. Here, too, you will find considerable saving. For a core that has glued members of solid walnut or mahogany on the outer edges has more money in its area than one unbanded, by virtue of the rare woods as well as the costly labor of applying them.

Most frequently the types of defects that cause these troubles in banded cores are poor glue joints that seem to have opened like an aching tooth since gluing; or were there, and not obvious until planed.

In order to correct this fault without going to the expense of removing the bands to get at the poor joint, one company built a jig for holding a portable router on ways that would guide the tool in a straight line. By placing the work under the router and lining the joint with the jig a clean cut can be made partially or all the way through the joint extending from band to band or for the length of the joint.

Strips of wood are pre-sized to the thickness of the router bit being used, then pressed and glued into the opening. Since this operation is performed only on finished cores, the protruding portion of the wood repair must be worked flush with the surface.

A drop saw arrangement can do equally as well as the work described for the portable router. However, it is more difficult for the simple reason many poor joints are along the random width parts that make up the core and consequently seldom parallel joints.

If the drop saw technique is used, care should be exercised to select a saw with a consistent set. This may vary from

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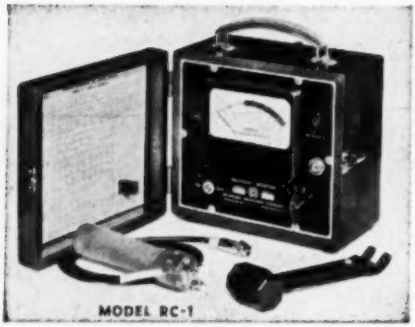

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time to time by a difference of setting and filling. A poor wood fit is worse than no repairs at all, for you have a hole several times larger than you are attempting to repair.

The Dope Repair

There are several types of wood dope that are quite satisfactory for making minor repairs. These consist mostly of finely ground wood dust worked into a paste with a binding agent of some type of quick setting glue.

There are other types such as oak crack filler or natural crack filler that consist of a fine mixture of mineral, with a setting agent bordering on the principle of mortar, hardening with water and drying.

Or you can make your own dope, if you like, with a little glue and waste sawdust about the plant. The glue most commonly used is hide glue or urea resin. The former will require a heated pot for storing while using and the latter will have a comparatively short pot life, depending upon how much catalyst you add to the mixture. Remember for urea resin to set rapidly when applied to a panel, it has in direct ratio a shorter pot life.

To prepare this mixture, use oak sawdust as the filling material. This should be sifted to remove all large chips; and then stirred into the liquid glue. A small amount of water is then added to produce a thick consistent mix that can be applied with a putty knife.

In general, large deep defects should not be filled with the dope for the simple reason it will take days for complete dryness to take place. If the defect is deep, first clean out the unsound wood so that the glue will have a toehold when it comes in contact with sound wood. Fill the greater part of the cavity with sound strips of wood with glue as a binder. We are then limiting

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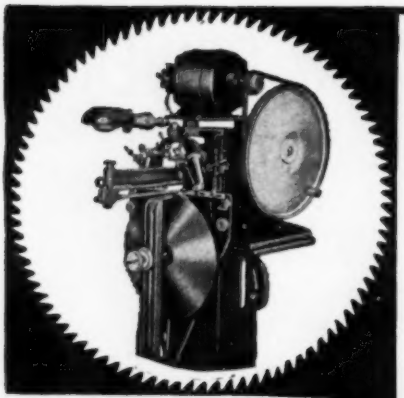

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the quantity of dope to a small portion that will dry quickly but firmly. Little shrinkage will be expected from a doped repair such as this.

A word of precaution in using the wood dope would be well at this point. On the surface this appears to be the least expensive and quickest means of repairing. Its initial cost is the least expensive. However, if done correctly, it requires a longer period of time to completely set.

It has a shrinkage factor which must be considered. One plant, not aware of this, found they were experiencing sunken places on the finished veneered surface. One of these was cut open and a doped repair was found beneath. In tracking the difficulty it was found the repaired parts were being worked too soon, without proper dope curing. Only the surface was dry at the time of working off the excess material and consequently drying continued after the panels were passed to the veneer laying operation. Further, when exposed to the heat of the hot plates, additional moisture was driven off, leaving a sunken foundation for the top veneer.

Remember on the mineral filled material large doped areas are frowned upon. For the simple reason little adhesion takes place between the veneer and a dope covered surface. This picture is different with wood filled glue which has a natural affinity for wood.

For this reason this type is recommended only on small worm holes and torn grain holes and then it should be applied with a putty knife sparingly and the surface wiped clean by a firm pressure of the knife edge.

Remember—it's patriotic to ask your boss for a raise. The government needs the additional tax on your salary.

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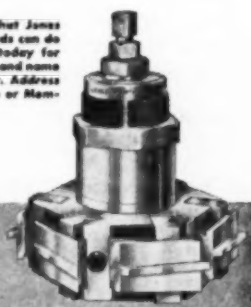

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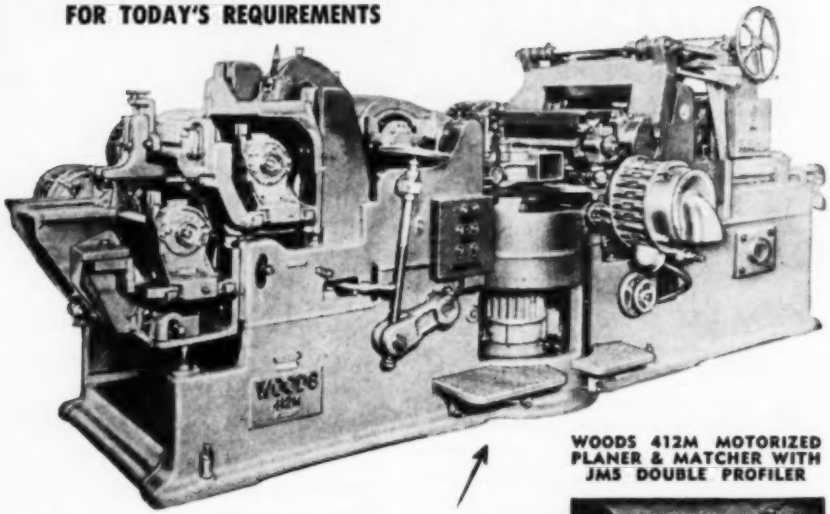

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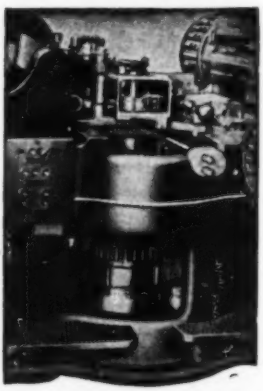

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WOODEN SHIPS SWEEP THE SEAS

By Bert Goldrath

WOODWORKING history is being made on the ways of the Wilmington Boat Works in the Southern California sunshine. There, on Cerritos Channel of the Long Beach-Los Angeles inner harbor, eight of the world's largest wooden minesweepers are being turned out for the United States Navy. But that's only part of the story.

The real drama being enacted at this Pacific port is the tremendous forward stride made in the process of lamination. Never before has lamination been attempted on so grand a scale, "Wilbo," as the boat-building company is known in the trade, tackled a hitherto unexplored set of problems when it accepted a Navy contract to build eight 171-foot ships of the AM421 class. Hacking its way through an unfamiliar jungle of difficulties, Wilbo launched the first of the vessels — the "Implicit" — on August 1, 1953. The "Implicit" hit salt water only 420 working days after the keel was first laid, and it would have been launched sooner except for delays due to some material shortages.

The first launching came only a little more than two years after Navy brass huddled over scale models with Wilbo's two co-owners, native Californians Robert E. (Bob) Carlson of Long Beach, president and William L. (Bill) Horton of Los Angeles, vice-president. Convinced that lamination was the key to the program's success, they boldly set out to form every single basic part of the ships from built-up lengths of oak and Douglas fir.

Launching of the USS "Implicit" and a major step forward for the process of lamination.

Even the ships' backbones, the keels, were built up of fir. However, the job of forming the keels was "farmed out" because Wilmington's facilities were not big enough to cure the gigantic sections. (Wilbo's peacetime function is the building of pleasure yachts.) But the beam members, across which a solid 2 x 2 deck is laid, the gracefully curved white oak frames and the triple-diagonally planked hull are all built up of 1 x 6's and 1 x 8's from 6 to 16 feet long.

Hard won experience showed the best way to apply the glue to create good glue lines. It is laid on with a roller before the laminated sections are placed in a press. The adhesive used

Peter Marcus

Bob Carlson, president

Bill Horton, vice-president

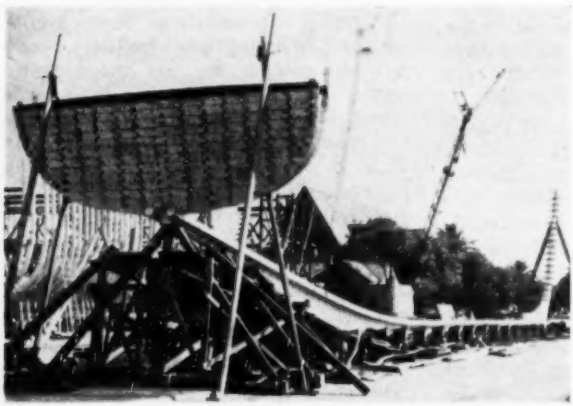
in the wooden "sandwiches" is a plastic resin base.

The board lengths, when they are brought into the yard, are carefully inspected as the first of four basic steps in the building-up process. Uncle Sam wants nothing but perfectly clear board lengths for the critical construction of a minesweeper.

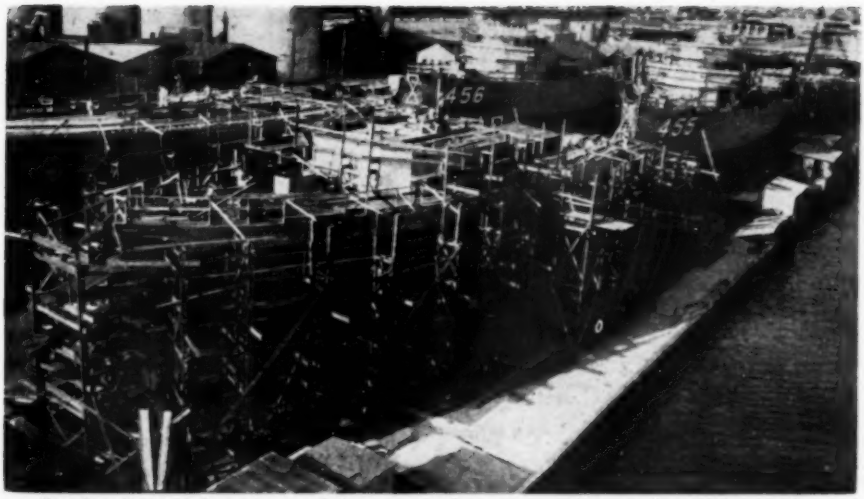
Once past the eyes and gauges of the inspectors, the pieces are scarfed so that the tapered ends fit perfectly together. Then they are glued into 61½-foot segments called laminars. Clamping and heat curing the laminars under batteries of 250 watt lamps for about 30 minutes permanently "welds" the laminars together.

Now the laminars are glue pressed together to the required number of thicknesses for the particular section of the vessel of which they will be a part. The next procedure is to place them in a jig for forming. The jig is a huge arc of metal templates designed to fashion the laminars into the shape they will hold when they go into the completed 'sweep. Clamped in the jig, the sections undergo the curing process. A mobile controlled steam blower, housed in an enclosed corrugated structure, is rolled on wide tracks over the sections in the jig for a measured period of steam cooking. After curing, the segments are cooled and dried. They are then ready for the sanding, sawing and trimming and hoisting into the belly of the ship by giant cranes that drop them into place like pieces in a jigsaw puzzle.

Wilbo laminated all the great frames for the eight ships in the contract at



The minesweeper "Implicit's" laminated keel is laid.

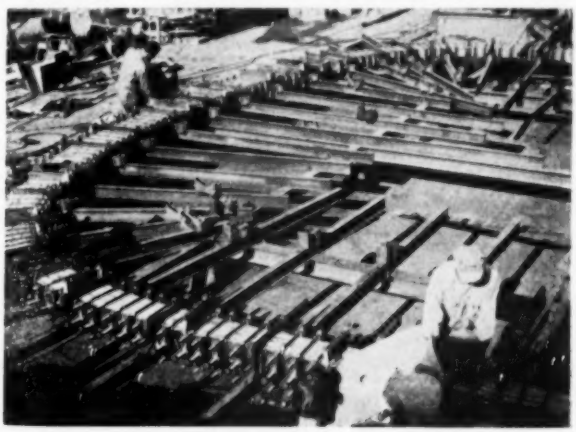


Overhead view shows several 'sweeps under construction at the Wilbo yard.

one time. Each frame was subjected to a rigorous delamination test.

The Navy takes no unnecessary chances with the lives of its minesweeper crews—their task is dangerous enough. The motto of this branch of the service is: "Where the Navy goes, we've been." Each ship carries a crew of 65 officers and men. Everything on the 'sweeps is nonmagnetic, even the new Packard diesel engines. Much information about the craft is restricted, such as the tonnage and the spacing of the frames. If an enemy submarine commander knew too much about the structure of the vessel he could plant a torpedo where it would do the most harm.

An interesting fact in connection with the minesweeper program is the harmonious labor relations that exist, even though there are ten different unions



Frames being placed in jig before curing.

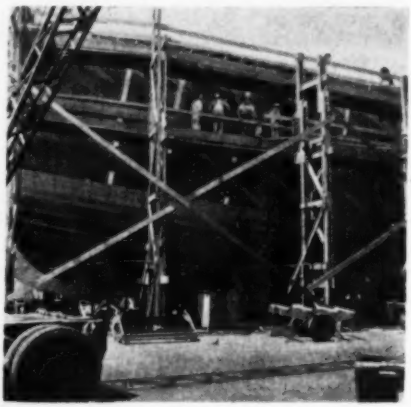
From "acorns" like these grow mighty ships.

for Wilbo's 750 shipyard employees. Personnel Director Peter L. Marcus reports that there has not been a single worker grievance in more than 16 months.

Partly as a result of this pleasant atmosphere, and partly because of Wilbo's know-how, these minesweepers have been termed "the finest wooden ships the Navy ever built." Stronger than any earlier wooden vessels, the minesweepers of the AM421 class are more flexible than if they had steel hulls. In fact, lamination resists flash fires better than steel. Steel beams might buckle under sudden, intense heat, but parts of laminated sections can be repaired.

The men at Wilmington Boat Works believe that, when defense requirements have been met and the national economy shifts to more of a peacetime pace, the potentialities of large scale lamination will begin to come into their own. Even now lamination is being used in heavy construction far more than was thought possible a few years ago. Only the imagination of engineers and builders will limit its possibilities for the future.

Roller-coated with glue, pieces are clamped together.



Workmen on scaffolding fasten up triple-planked hull.

It's been only about a century or so since all ships were built of wood. Then America boasted forests of tall timber. The timber is considerably less tall in most areas now, but that is no obstacle to successful lamination, which enormously increases the strength of wood.

The construction miracle taking place at Wilmington Boat Works, while only a forerunner of things to come, is still only a part of what is actually going on now. Wilbo is only one of 14 boat

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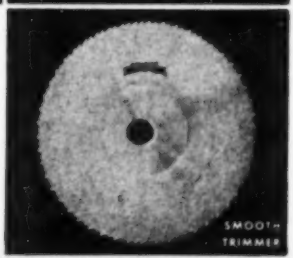

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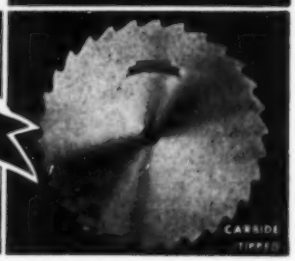

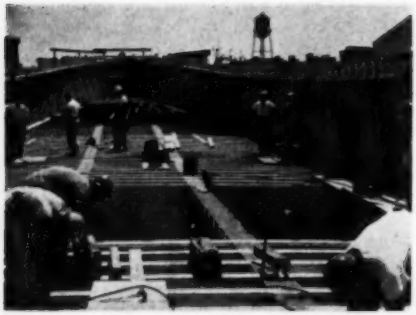

Even the deck beams are laminated.

builders in the U. S. which are turning out minesweepers to a totally new formula.

Although the new class of minesweepers might sire a new breed of wooden vessels for our merchant marine and Navy, they are quite unlike the wooden ships manned by iron men that plied the seven seas in an earlier chapter of the world's maritime history. Each one of these craft has a tonnage greater than that of Columbus' famed fleet, the "Nina," the "Pinta" and the "Santa Maria." The exact displacement of the minesweepers is another secret the Navy is keeping to itself.

That the Navy is building great oaken ships from relatively tiny acorns of timber is no secret, however. And it may be that this whole shipbuilding program will be the acorn from which a great new industry will grow—based on the idea that man can improve on nature by the wonderful process of lamination.

The attitude of some toward safety is like most people's attitude toward a leaky roof.

When the weather is fine there is no reason to patch the roof and when it is raining it is impossible to put on a patch.

Patents Pending

Write for bulletin and details

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". . . Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant—which means a considerable saving.—J. B. Black, Plant Superintendent, Ocala Manufacturing, Ice and Packing Co., Ocala, Fla."

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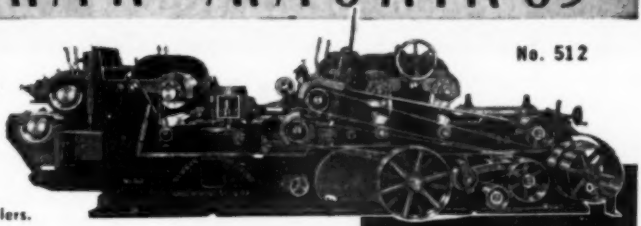
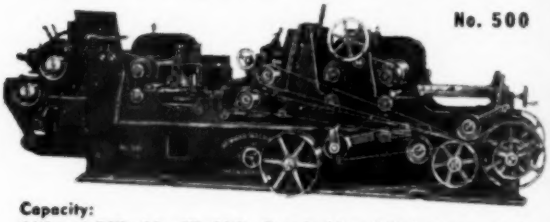


No. 512

Capacity: 16" and 24" wide, 8" thick.
Speeds up to 325 feet per minute.
8" dia. cutting circle.
Six 12" dia. feed rolls.
Single and double profilers.

BALL and ROLLER BEARING PLANERS AND MATCHERS

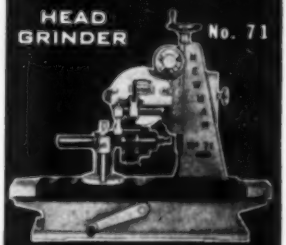


No. 500

Capacity:
14" and 24" wide, 6" thick. Speeds 40 to 200 feet per minute. 7" cutting circle. Six alloy steel feed rolls. High carbon special alloy steel cylinders. Single or double profilers.

The ball bearing NEWMAN 71 (shown below) will grind all sizes of cutter heads. Table is 33" long by 9" wide with horizontal travel of 25" and is heavily ribbed to maintain accuracy over entire travel. Maximum cutter head swing is 11".

HEAD GRINDER **No. 71**



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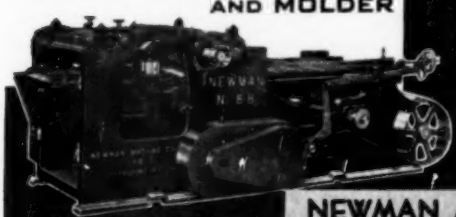
ALL NEWMAN cylinders or heads are DYNETRICALLY BALANCED insuring an accurate and superbly finished product.

Ball and Roller Bearings

No. 55 AUTOMATIC PINEAPPLE FEED TABLE

The NEWMAN 55 feeds stock automatically to high speed planers and matchers up to 450 lineal feet per minute. Capacity: 30" wide, 8" thick. All adjustments and controls are centrally and conveniently located.

No. 8-B PLANER, MATCHER AND MOLDER



The NEWMAN 8-B planes 22" wide and 8" thick, joints 4" thick and will match 14" wide. 6" diameter feed rolls. Speeds of 30, 50 and 75 feet per minute.

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Wood Working Panel

Russell C. DECKERT

WOOD WORKING Panel, a service for readers of Wood Working Digest, is conducted by Russell C. Deckert, industry service representative, at the State University of New York College of Forestry at Syracuse.

The purpose of this feature is to answer readers' questions regarding the use of wood in wood industries. It is hoped that other industries with similar problems will benefit by reading the questions and answers.

Questions should be sent directly to WOOD WORKING DIGEST, 222 East Willow Ave., Wheaton, Illinois.

We are interested in the manufacture of laminated baseball bats. Specifically we would like information as to the demand for laminated baseball bats and their strength properties.

This is a difficult question to answer. Several of the companies manufacturing baseball bats have been experimenting with a laminated bat for years, but to the best of our knowledge this research data has not been published or made available.

There are four or five companies now producing laminated bats, but sales appear to be limited. I think the principal reason for this situation is the lack of sufficient performance records and the fact that it has not been universally accepted by the baseball officials. Recently Commissioner of Baseball, Ford Frick, stated: "The Rules Committee has approved the use of a laminated bat as concerns baseball generally. The bat has not been approved for use in the major leagues. Baseball rules apply to the conduct of the game throughout the country. The Rules Committe had the feeling that the use of the laminated bat might be valuable in sand lot games, in amateur competition, and possibly in some of the smaller minor leagues since they felt it could be produced more cheaply and might be subjected to less breakage. I doubt that it will be used in the major leagues for some time."

The performance records of other laminated wood products indicate that a baseball bat of laminated construction can be made as strong, or stronger, than one of solid wood. In recent years there seems to have been a demand for baseball bats of lighter weight than used in former years. For instance, where formerly a particular player used a 35" bat with a weight of 38 oz., he now wants a bat of the same length but 32 oz., in weight. Removing this extra wood to reduce the weight naturally results in a weaker bat and an increase in breakage.

At the present time price is one disadvantage of the laminated bat, since a laminated bat costs more than a solid bat of the same quality.

Recently we received requests for chemically treated plywood to resist fungi and insects. We have no previous experience along this line and

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- **ROUTER BITS**
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- **3 LIP CUTTERS**

and Many Other Cutting Tools
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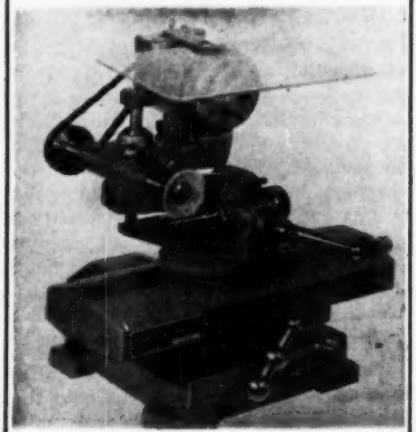

The primary purpose of this motorized, positive indexing Router Bit Grinder is to eliminate freehand grinding on hundreds of small cutting tools. The machine sharpens high speed and carbide cutters on an entirely mechanical basis, with extreme precision, saving cutter life and improving quality and quantity of production. Write for circular.

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any information you may be able to give us will be greatly appreciated.
(W. C. H., N. Y.)

At the present time plywood is being successfully treated with many of the commercial wood preservatives. For best results plywood should be bonded with a waterproof adhesive such as a phenol or resorcinol adhesive. However, in some cases a urea formaldehyde has been used.

The type of preservative treatment will depend upon the ultimate use of the plywood. When the plywood is used under extreme conditions favoring decay and insect damage, a pressure treatment should be applied. For interior use or other uses, where the plywood will be exposed to minimum damage from fungi and insects, a soak treatment may prove to be satisfactory.

If a water soluble preservative is used to treat the wood, the treated material must be re-dried and the surface cleaned or sanded before it is put into use. This is necessary because of the large amount of water injected into the wood during the treatment.

The preservative treatment of veneer before it is bonded into plywood is a more difficult operation. However, most of the commercial wood preservatives can be used. The important thing to keep in mind is to clean the treated veneer surface before bonding. All surfaces should be free of an excess preservative before applying the adhesive. Research conducted at the Forest Products Laboratory, Madison, Wisconsin, has indicated that curing temperatures are higher than those used for bonding non-treated veneer.

We would like to know how we can eliminate blue stain in white oak veneer. Briefly our problem is as follows: It seems as though a great number of sheets of veneer in a flitch show blue stain. This is not always

present on the samples from which the veneer flitch is sold. Consequently when the customer gets the complete flitch and finds blue stain, he complains that the flitch is not sampled properly.

(S. W. H., Pa.)

Harold B. Gatslick, drying specialist in the Department of Forest Utilization, has the following suggestions to offer. If you dry the veneer in a kiln, hot box, or mechanical drier, below 20% moisture content, blue stain will not normally develop unless in storage or shipment it is exposed to high humidity conditions.

As added protection, a chemical treatment with a 5% sodium pentachlorophenate solution can be employed following cutting and prior to drying. This will minimize blue stain development in shipment or storage at the customer's plant.

At the present time we are interested in utilizing the waste sawdust and shavings generated at our plant. We have considered the manufacture of wood briquettes. Do you have any information on this subject?

(D. C. B., Pa.)

A successful wood briquetting operation is dependent on a large and steady supply of raw material and low operating costs. In addition the price of the wood briquettes must be low enough to compete favorably with other fuels. Finally, because of the low value and bulkiness of the briquettes and high transportation costs, the markets for this material should fall in the general area of production. This last requisite is of extreme importance. In general, the wood waste briquette is made by compressing previously dried (8 - 10% m. c.) sawdust, shavings or shredded wood, of a fairly uniform size, in a heavy press. The standard size of a stove or a fireplace briquette is 4 ⅛" in diameter and 12 ¾" long, with a weight

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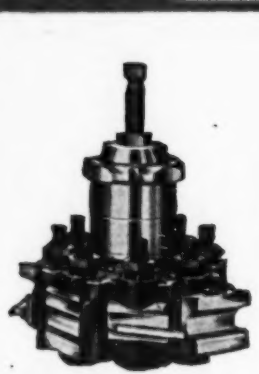
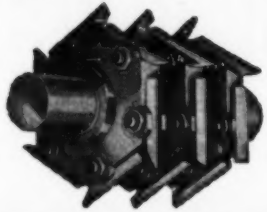


New 200 Series Head. With 8 bits for door sticking.

New 200 Series Head. Shown with eased edge bits.



Maintain Pattern for Uniform Quality. Milled-to-pattern bits always assure uniformity. The pattern remains exactly the same throughout each bit, as well as in sets of bits of the same pattern. Knives ground to pattern often have variations, which show up in the finished product.

Faster Feed Rates. Since the pattern is uniform in the bit, more bits can be placed in the cut, permitting faster feed rates.

Engineered for Best Results. The *milled bit* is always manufactured with the cutting angle correct for the material to be run, resulting in better finished stock.

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Milled Bits Hold Cutting Edge Longer. The pattern is milled into the bit, thus backing up the cutting edge and supporting it in the cut, resulting in

Milled Bits Hold Cutting Edge Longer. The pattern is milled into the bit, thus backing up the cut-

ting edge and supporting it in the cut, resulting in longer life. To resharpen it is only necessary to grind the bevel forming the cutting edge.

Formed jointer stones can be used to keep the sharpest of cutting edge between grinds and tend to keep all bits in the cut.

Yates-American has literally hundreds of stock head and bit designs to meet most needs—and the skilled engineers to work out others for special patterns. Tell us of your requirement.

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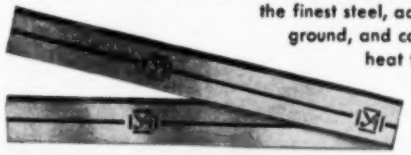

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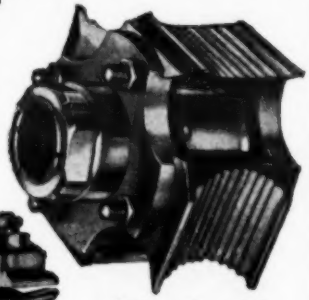
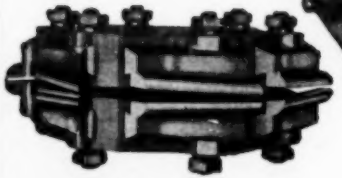
Vise-Grip Head. For heavy matching.





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New 200 Series Cope Head. Adjustable for perfect cope fits.

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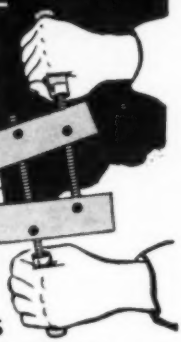

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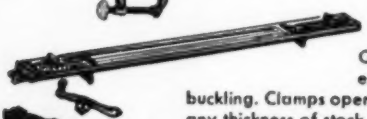

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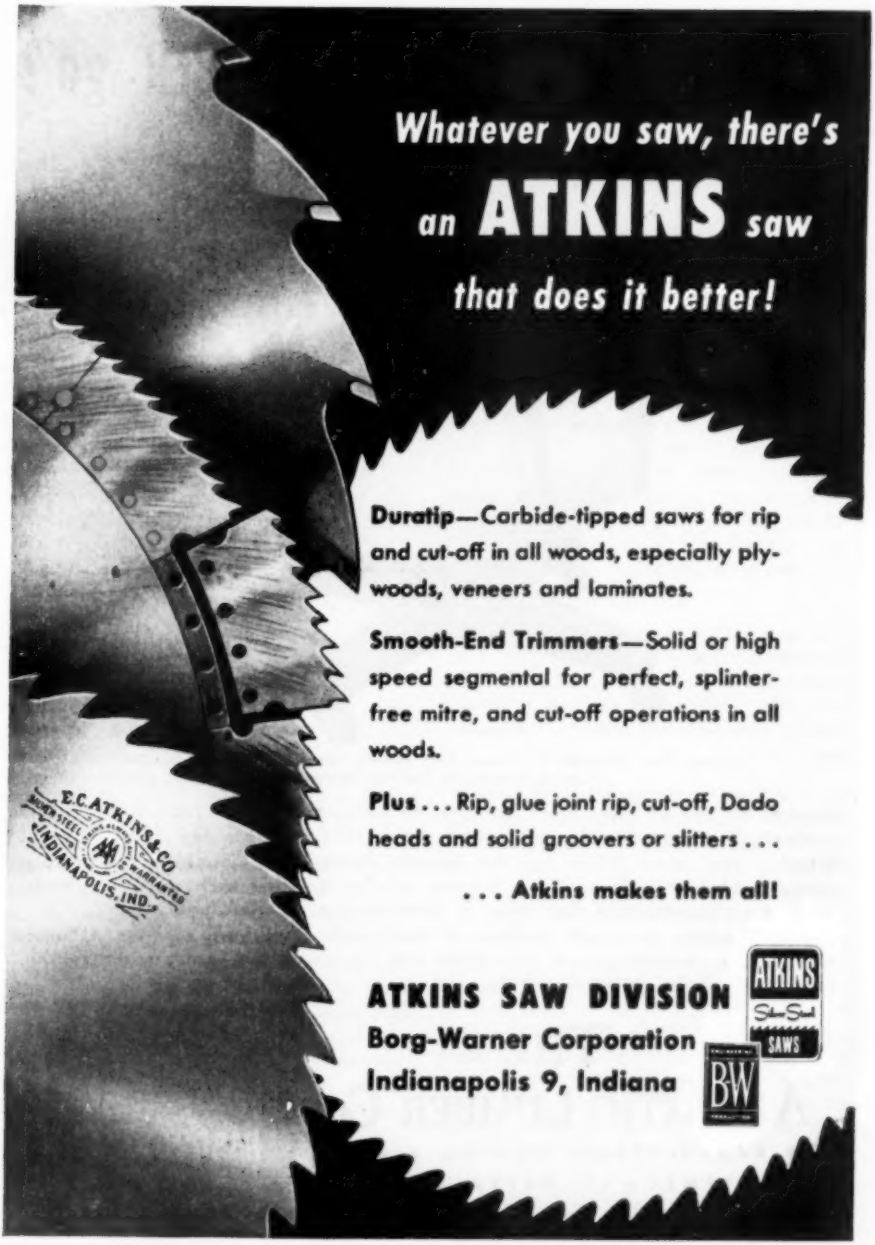
of 8 lbs. Briquettes made for stokers are classified as stoker fuel and are usually 1 ⅛" to 1 ½" in diameter and broken in odd lengths.

The principal advantages associated with the use of wood briquettes are: (1) cleanliness, (2) small volume of smoke and ash, and (3) uniform combustion. Wood briquettes have a lower heat value than coal or oil, but the advantages associated with the use of wood briquettes may aid in competing favorably with other materials.

Information on wood briquetting machines may be obtained by writing to Wood Briquettes, Inc., Lewiston, Idaho; Walter W. Letts, Northville, New York; and Jack M. Pari, Chestertown, New York.

You can't get your head above the crowd without sticking your neck out.



Whatever you saw, there's an **ATKINS** *saw that does it better!*

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By James Parsons

CABINET and many other woodworkers around the nation will have increasing opportunity in the months and years ahead to make use of an interesting wood which is new to most localities.

It is Engelmann spruce, a species which has grown in a few western states and provinces since time immemorial but has been little logged because it grows at the higher and less accessible altitudes.

Now, however, a little beetle about the size of a grain of wheat has attacked the Engelmann spruce stands of northern Idaho and western Montana and is threatening to destroy billions of feet of timber. Since this section is about midway between the northern and southern ranges of the species, the Engelmann spruce growing there is considered the finest of its kind. Trees often tower 150 feet, with diameters of three feet or more.

With chemical control of the beetle horde economically impractical except on a very limited scale, government agencies and private industry set up a joint "task force" which plans the logging of huge quantities of spruce. Two ends are achieved. Attacked trees can be milled rather than left to rot in the woods. Spread of the beetles is checked since the adults and eggs are either burned in slab fires or drowned in sawmill ponds.

Lumber from attacked spruce trees is not affected by the beetle infestation. The insects bore through the bark, then girdle the cambium layer, which kills the tree. Beetles never enter the wood itself.

Under normal conditions, so relatively light a volume of Engelmann spruce would find its way to market that it would be absorbed in a few common uses and might never come to the attention of cabinet workers or the hobbyist with a home shop. But now, with plans for logging ten times or more as much spruce because of the beetle emergency, it has become imperative for manufacturers to find new sales outlets.

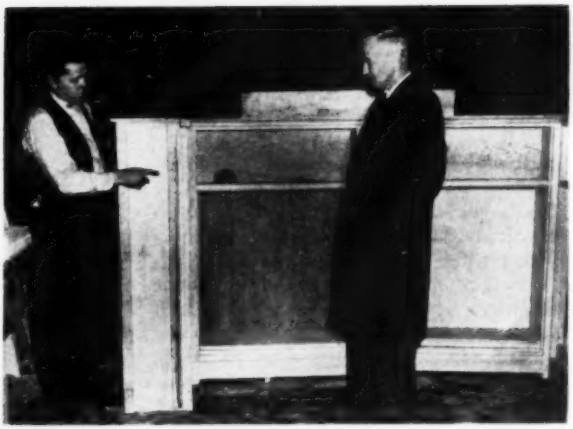
They are discovering to their delight that the wood has many interesting and unique qualities which will appeal to those seeking something new and different in wood for cabinets, paneling, furniture and other interior uses.

North Idaho Engelmann spruce is as different from other varieties of spruce as Guernseys are from Shorthorns in the bovine world. In appearance, it somewhat resembles Idaho white pine —in fact, there have been cases where the similarity was so marked in selects that only certified graders could distinguish between them.

In other grades, Engelmann has small, tight knots distinctively different from other knotty woods. It is light in weight with adequate strength, fine grained in texture, easy to handle and work, and easy to sand, paint and finish.

Mr. Parsons is with the Pack River Sales Co., Spokane, Wash. All photos used in this article were furnished by the Pack River Sales Company.

At mile high elevation in the mountains of north Idaho, 32' long Engelmann spruce logs are loaded by jammer on a big truck to be hauled to the sawmill.



North Idaho Engelmann selects are used by a Washington, D.C. Millwork firm for bookcases and cabinets.

North Idaho Englemann spruce in blond finish adds to beauty of this office. The paneling, 12' high, is 8", 2 & Btr. common in the popular WP6 pattern. Small tight knots are welcome variations from other and more commonly used knotty woods.

Popular blond finish used on this hutch built of north Idaho Engelmann spruce proved particularly attractive to women.

Western Pine Association reports that "few softwoods work up as satisfactorily for interior finish and millwork as Engelmann spruce. It is a good wood for molding, casing, base, ceiling, partition, turned stock, wainscoting, paneling and window frames.

"Engelmann spruce is especially suitable for cabinets, cupboards, coolers, ice boxes and food bins because of the fact that the wood is tasteless and odorless, whether it is wet or dry. Furthermore, its clean, bright color, its ability to hold glue, its freedom from warping and checking and the fairly wide size available are all factors that contribute to its extensive use."

Pack River Sales Co. of Spokane, Washington, representing a group of lumber manufacturers in the north Idaho Engelmann spruce area, has had a well known Pacific Northwest cabinetmaker do experimental furniture building and has been happily surprised with results. Some of his pieces were exhibited at a number of eastern and midwestern conventions of retail lumbermen. They proved particularly attractive to women.

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Basswood	4/4 to 8/4
Beech	5/8, 4/4

SOUTHERN STOCK

Ash	4/4 to 12/4
Sap Gum	4/4 to 8/4
Tupelo Gum	4/4, 5/4
Red Gum	4/4, 5/4
Hackberry	4/4, 5/4
Soft Maple	4/4 to 12/4
Poplar	4/4 to 12/4
Steamed Walnut	5/8 to 10/4

TRUCK BODY STOCK

Oak and Hickory S2S, A.D.	4/4 to 8/4

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Honduras Mahogany	4/4 to 12/4
Parana Pine	4/4 to 8/4
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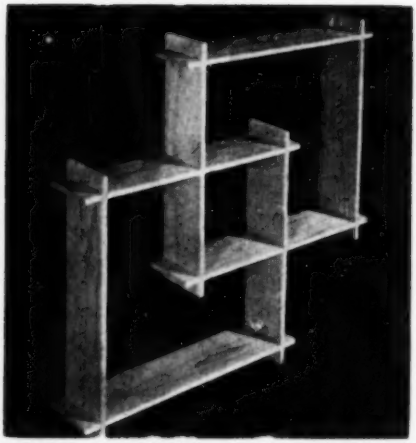

Knicknack shelf for a wall was made of ¼" north Idaho Engelmann spruce selects planed down from a ¾" board.

Cabinetmakers have found it best to use a hollow ground blade when sawing Engelmann spruce to prevent chewing and splintering on the bottom side of the board. All who have used it have praised its easy sanding qualities.

Pack River Sales Co., in experimenting with finishes, discovered that the light color and small knots lend Engelmann spruce delightfully to the blond appearance currently so popular in both furniture and wall paneling. The blond finish was achieved in these eight steps:

1. Sand. 2. One coat penetrating sealer. 3. Sand. 4. One coat white Rez, left 10 to 15 minutes, then wiped off. 5. Sand. 6. One coat high gloss varnish or shellac. 7. Sand. 8. One coat dri-dull varnish.

Different color effects are obtained by varying step No. 4.

North Idaho Englemann spruce, D & Btr. grade, was used for this picket fence.

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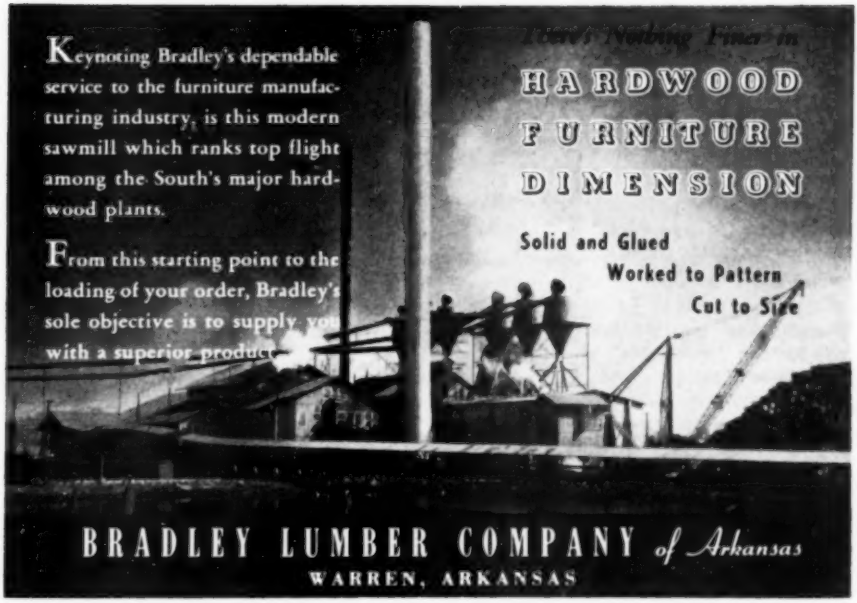
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CONVAIR'S WOOD MILL

By Thomas A. Dickinson

MOST modern aircraft factories have wood shop facilities for the fabrication of scale models of proposed new airplanes, the construction of full-size production "mockups," the fabrication of foundry patterns, etc. But only one, at this writing, is known to have put woodwork on a true production basis.

That one is Consolidated Vultee Aircraft Corporation of San Diego, Calif., a company noted for its production of all-metal airplanes—ranging from the Catalina flying boats and Liberator bombers of World War II to the B-36 "atomic bombers" and the XF-92 fighter, Delta-wing design of which has caused it to be acclaimed by experts as the prototype of "tomorrow's high speed airplane."

Like other aircraft manufacturers, Convair has for many years utilized woodworking equipment in the construction of models, mockups and special tooling. Now, in addition to the usual wood shop facilities, this company has established—as an adjunct to its plant maintenance facilities—a production-type wood mill.

The specific purpose of Convair's wood mill is to manufacture the many old-yet-new wood products—such as office furniture, work benches, cabinets and pallets—which are essential to the efficient maintenance of production operations in a modern aircraft factory.

Many smaller companies would (and do) find it most practical to purchase these items from independent wood shops, since their production requirements are not great enough to merit a substantial investment in woodworking equipment and skilled personnel.

Convair's investment in a wood mill has been both practical and profitable —to the extent of reducing expenditures for wood products by an estimated margin of 50%—because this company's operations necessitate the fabrication of 15,000 board feet of lumber (enough wood to build a 14-room house) each week.

A particularly interesting feature of Convair's wood mill is the fact that it is capable of producing articles with an almost unlimited variety of design details in large or small quantities

This wood table had to be assembled without using a single nail because its eventual usefulness was dependent on a complete lack of magnetic properties.

Wood products that cannot be completely readied for use in Convair's wood mill are finally assembled as they are installed, as shown here, by carpenters.

without a substantial deviation in efficiency. For example, a new type desk for a top flight executive was recently made by the mill without interrupting a project which called for the conversion of 66,000 board feet of lumber into production pallets—despite the fact that the pallets and desk had to be made with the same tools and equipment.

Accomplishments of the latter type were made possible by arranging tools and equipment so that the materials required for any new article could be processed during the following sequence of routine operations:

(1) Raw materials are cut to dimensions specified for the efficient fabrication of parts.

(2) Jointers are used as necessary to straighten the sides and edges of materials.

(3) Sides of the materials are squared by planing.

(4) Materials are cut to length with a rip saw or cutoff saw.

(5) Routing, trimming and shaping tools are used as necessary to produce finished parts.

(6) Parts are assembled.

(7) Assemblies are finished.

Materials thus processed include birch, spruce, mahogany, walnut, white pine, balsa and Douglas fir. Also, virtually all available types and sizes of plywood and laminates such as Masonite can be processed in this way.

Jointers, shapers, planers, saws, routers, sanders, lathes and other machine tools used by Convair wood-

Wood retainers for use by Convair production workers are readied for use by a wood mill employee.

Foundry patterns have been made from wood by American aircraft manufacturers for many years. At Consolidated Vultee, they are made in a special pattern shop because their construction involves the use of tedious tool-making techniques. Wood products requiring less precision are made with greater economy in the wood mill.

workers are standard Delta, Yates-American and Oliver units of the types that can be found in many wood shops. However, considerable time and money have been saved in recent months by equipping these tools with carbide tipped cutters—each of which is said to yield 187 more hours of service than could be obtained with other types of cutters.

Cold setting phenolic resin adhesives, such as the Weldwood and Bakelite products, are almost invariably used at Convair for the assembly of wood parts. Assemblies, in turn, are usually lacquer or enamel finished in a conventional manner with pneumatic spray equipment.

About 70% of the products turned out by Convair's wood mill are specially designed and made to order. Other articles include replacement parts, such as new legs for damaged tables, and production components, such as decorative panels for the interiors of airliners.

This necessitates the constant employment of 50 workers, 20 in the shop and 30 in supplemental capacities. The latter include clerical workers, carpenters who install wood mill products, engineers and supervisory personnel.

No particular efforts are being made to reclaim waste products of the wood mill at this writing, since all of the 500 cubic feet of sawdust that are accumulated each week can be sold at reasonable prices to nearby stables.

U.S.-MENGEL ANNIVERSARY

U.S.-Mengel Plywoods, Inc., now one of the largest distributors of plywood and allied products in the nation, is celebrating its 10th anniversary.

The organization, jointly owned by two of the outstanding enterprises in these industries—United States Plywood Corporation and the Mengel Company—was started 10 years ago in a small warehouse space in Louisville, Kentucky.

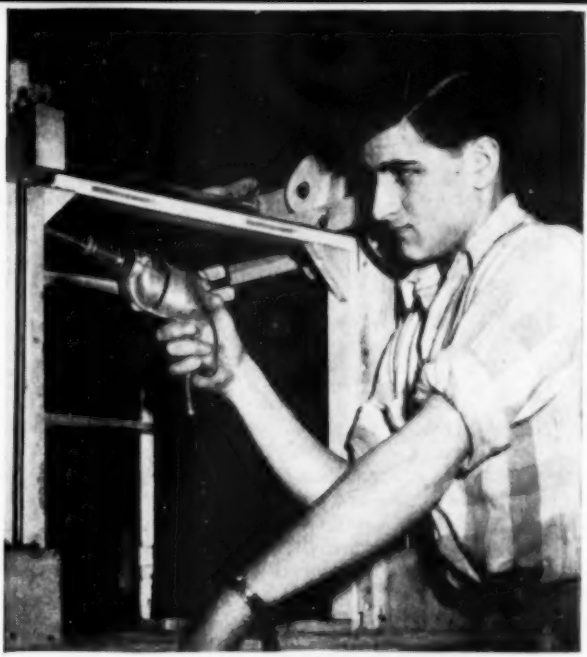
From this modest beginning, U.S.-Mengel Plywoods, Inc. has expanded to a distribution organization embracing 25 warehouses or distribution units located in 13 states. Sales have grown to an annual volume in excess of $16,000,000. Net assets have expanded to $4,131,757.

ENTERPRISE INCREASES LINE

The Enterprise Company of Columbiana, Ohio, builders of saw mills and special machinery for 75 years, has purchased the "Crescent" 24" planer line and the "Crescent" 36" band saw line from the Crescent Machine Division of the Rockwell Manufacturing Company. Enterprise will furnish these machines under the "Crescent" trade name.

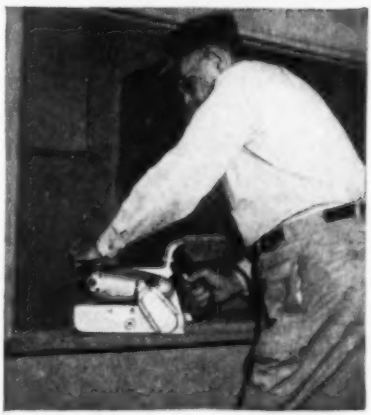
"Driving 1,700,000 screws in 20 weeks, SKIL Drivers perform while others failed!"

—says **Joe Wood,** owner,
Wood Manufacturing Co.,
Manayunk, Pa.



"One of the biggest TV makers gave us an order for 20,000 cabinets with delivery over 20 weeks," owner Wood explains. "And with 86 screws per unit, that's almost 2 million screw operations. It was a job that once and for all proved the superiority of SKIL Drivers—they stood up and took real punishment while other makes burned out.

"After eight years experience with SKIL tools we *know* they are better, more durable performers," Mr. Wood continues. "We now rely on SKIL Drivers and Drills, our SKIL Belt Sanders and a SKIL Saw. Every one is a *production* tool with quality proven *on-the-job!*"



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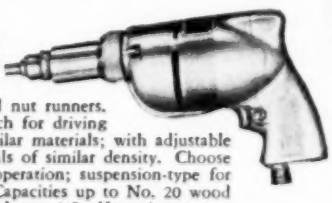

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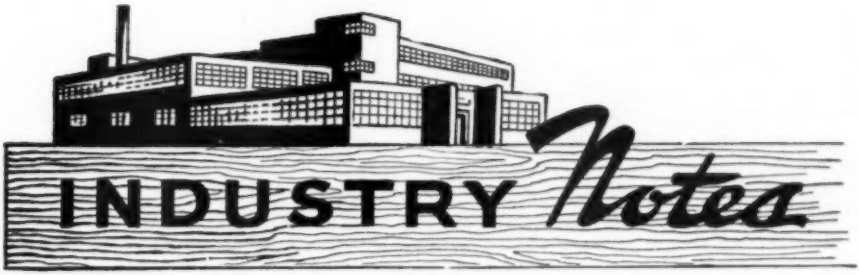


INSTITUTE ADOPTS SEAL

A labeling system designed to permit ready identification of genuine hardwood plywood produced by American manufacturers is now in operation, the Hardwood Plywood Institute has announced. Under this plan, put in effect September 1, panel marketed by participating mills will bear stamps attesting to their quality and origin.

The trade mark is a green-black circle on which appear the lower-case letters "hpi." Rimming the circumference are the words, "Certified American Quality —Hardwood Plywood Institute."

Where practical, the trade mark will be carried on the back of a panel, either as a rubber stamp or a pasted-on label. When it is undesirable to mark either face, a narrow stamp will be placed on a panel end. This will show the circular emblem, with the words, "Certified American Quality Hardwood Plywood," in a line to the right.

The labeling device is an important step in the Institute's newly initiated trade promotion program, which calls for the expenditure of half a million dollars in two years to further the uses of American-made hardwood plywood, according to Richard D. Behm, the program's director.

Proper designation of species, Behm said, is a key policy of the promotion program. Such identification, he pointed out, will facilitate marketing and use, besides protecting the public against substitute products. Another objective, he stated, is the establishment of uniform nomenclature for various grades.

F.P.R.S. NOTES

The Forest Products Research Society, the national organization devoted to research in all branches of the utilization of wood, recently organized a subject matter committee in logging and milling. This committee is composed of representatives of industry, federal and state organizations and manufacturers of logging and milling equipment in all sections of the U.S. and Canada.

Sectional meetings are planned for November. The Midwest Section meets in Chicago, November 12-13. The meeting will be built around the theme that in innumerable applications wood is superior as a working material to such materials as plastics, light metals and structural iron.

The Deep South Section meets at Lufkin, Texas, November 9-11. This section will feature debarking and chipping operations among other problems to be throughly aired at its fifth annual meeting.

The Pacific Northwest Section held its meeting at the Puget Sound Naval Shipyard, October 13. The group had the opportunity of touring either the woodworking shop or the shipyard laboratory.

The Florida-Georgia-Alabama Section held its annual meeting October 30-31. Theme of the meeting was chemical utilization of hardboards.

November 3 found the Great Lakes group meeting at Grand Rapids to discuss "Is High Frequency For Me?"

"Woodworking Industry's Unsolved Problems of Common Interest to Men,

Management and Educators" is the theme used at the Northeast Section Meeting, New Haven, Conn., November 5-6. Group discussions covered finishing, gluing, machining, sawmilling, kiln drying and materials handling.

Carolinas-Chesapeake Meeting was held at Richmond, Va., October 23-24. Discussions covered gluing, finishing, lumber cores, logging and log utilization.

GEX—NEW VENTURE

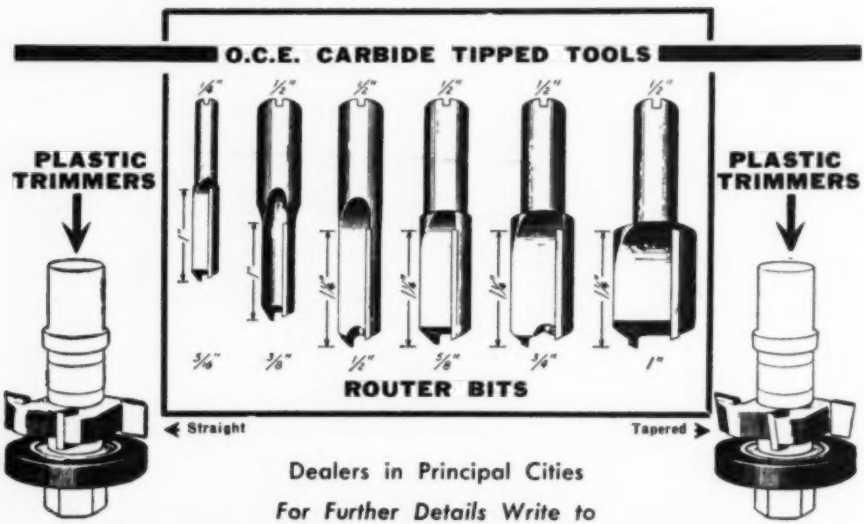
The General Equipment Exchange, Statesville, N.C., has been established by Francis R. Quis to help firms convert surplus equipment and miscellaneous supplies to working capital. The function of GEX is to tell business men of a variety of wants and offerings, and bring the interested parties together. Periodically wants and offerings are listed in the "GEX Announcer." Mr. Quis tells us that both new machinery salesmen and also used machinery men will find this new service helpful.

WOODWORKERS INDUSTRY SHOW

Suppliers to the woodworking industry are showing tremendous interest in the Woodworkers Industry Show to be held next May 5-7 in Grand Rapids, Michigan. The event will be the first full scale exhibition of woodworking machinery and equipment in several years.

The show, to be held concurrent with the 1954 National Meeting of the Forest Products Research Society is being staged by the recently formed Hiller & Stuart Company of 601 Fifth Stret, Grand Rapids 2, Michigan. Grand Rapids Civic Auditorium has been reserved for the event. Heavy mchinery and operating equipment will be displayed on the ground floor while a huge upper level space is available for displays of supplies and light equipment.

Machinery exhibits are accepted only from manufacturers. However, Hiller & Stuart have provided a special ground floor area for machinery dealers who may desire a contact point and place for distribution of literature.



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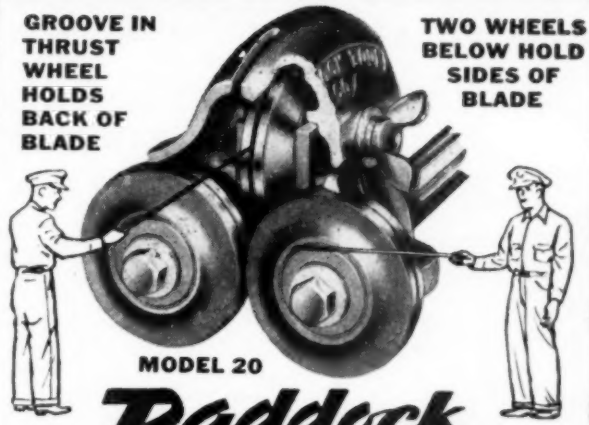

MODEL 20

Paddock

BALL-BEARING

BAND SAW GUIDES

MODEL 20, shown above, can be installed on machines having 2½" back of blade to guide post. It's designed to work above or below saw table. Inter-changeable ball-bearing wheels give friction free support to blade. Cut out section pictured: shows grooved thrust wheel that holds back of blade. Side wheels and thrust wheel run with blade. Easier and better adjustment for thrust wheels for ⅛" to 1¼" wide blades. Models for large or small machines. Give size, make of machine on which guide will be used. Write for circulars, prices, etc.

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Suppliers to the woodworking industry can obtain full information on the show by contacting Hiller & Stuart Company. Brochures are available on request.

NATIONAL HARDWOOD LUMBER ASSOCIATION MEETS

The 56th annual convention of the National Hardwood Lumber Association, held in Chicago, October 6-8, proved to be the largest one ever held in the U. S. by this organization. Highlight of the convention was the trip—tours arranged for each day—to the Hardwoods Exhibit at the Museum of Science and Industry.

The men who have held office for the last year were re-elected. They are: Harry D. Gaines, president; James Co. Walsh, T. M. Millett, Franklin T. Griffin, vice-presidents; and Joseph L. Muller, secretary-manager. Charles Caphey, A. L. Copeland and George Houghton were elected directors for a three-year term.

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★ The latest addition to the famous MEYCO line of precision cutting tools. This new controlled cut, carbide tipped safety saw has many advantages: It's SAFE: will not pull hand into the blade, will not grab and kick-back work. It's ECONOMICAL: costs less to buy, longer life between grinds; cuts smoother, longer. Its CONTROLLED CUT regulates rate of feed, assures clean cut; makes chips instead of saw dust. Available at leading mill supply and hardware houses, or direct from factory. Write for fully descriptive literature and price list. Ask for Catalog No. 37

W. F. MEYERS CO., INC., BEDFORD, INDIANA

Another item of business was rule changes in hardwood grading. These revisions will be included in the next edition of the Grading Rules.

WOODWORKING MACHINERY MANUFACTURERS MEET

The Association of Manufacturers of Woodworking Machinery held its fall meeting at Chicago recently. Speaking on "A New Challenge," Charles R. Sligh, Jr., president of the National Association of Manufacturers, presented his views of the European economic situation, the outlook for business in this country, the possible effect of anticipated tax reductions, etc. Having just returned from several months in Europe, Mr. Sligh was well informed on conditions abroad.

Also speaking at the meeting was C. A. Wiken, vice-president in charge of research and engineering development, Rockwell Manufacturing Co. Mr. Wiken

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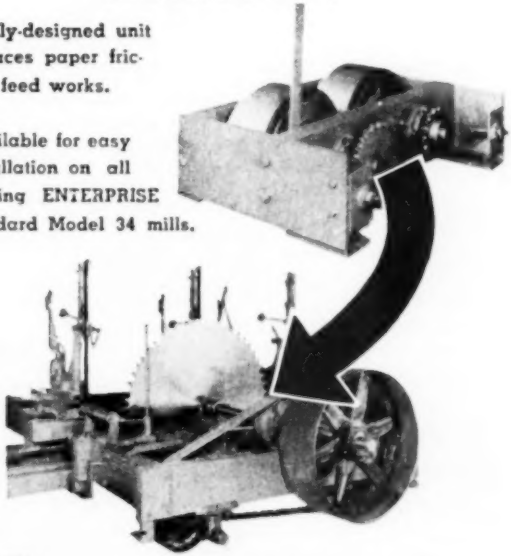

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has just returned from an extended visit to a number of European countries where he visited woodworking machinery plants and woodworking factories. He presented first hand information on production methods and how their products compare with U.S. manufacture.

The program for the meeting of the association was highlighted by individual discussions of current business conditions, the present outlook, competition from foreign-made machinery and plans for the machinery show to be held in Grand Rapids next May.

There was also an extensive discussion of various codes affecting the woodworking machinery industry and plans being made to see that these are written so as to make it possible for individual manufacturers to comply.

A conservative is one who has something to lose.

Appointments

Charles E. Devlin has been appointed as managing director of the National Plywood Distributors Association. He is the manager of the Plywood Div., J. R. Quigley Co., Gloucester City, N. J. Devlin will make his headquarters in Chicago.

Greenlee Brothers & Company has made **L. H. Geddes** its new executive vice-president. **D. E. Hawkinson** was elected vice-president of Greenlee Brothers & Co., in charge of machine tool sales and **R. J. Samuelson** was elected vice-president of the Greenlee Tool Co., in charge of tool sales.

Jackson Lumber Harvester Co., has named **Bert R. Roberts, Jr.**, as new secretary and **Raymond H. Mantle** as treasurer.

Don L. Davis, Jr., is the new vice-president in charge of sales at the Aetna Plywood & Veneer Company. Formerly he was secretary, a position now filled by **Arthur Schwanke, Jr.**

Southern regional manager for the Delta Power Tool Div., of the Rockwell Manufacturing Co. is **Hubert R. Carlson** of Oklahoma City, Okla.

Jed Davison has been appointed sales manager of the Morgan Manufacturing Co., Black Mountain, N.C.

American Box Co. has named **Z. R. Meredith** as comptroller to direct all accounting functions and to revise the methods, procedures and costing systems.

S. W. "Tony" Antoville has been elected president of the United States Plywood Corporation. He has been with the firm for 32 years. **Lawrence Ottinger**, founder of the company and only president since its inception in 1919, remains as chairman of the board and chief executive officer.

National Casein Company, Chicago, has appointed **Russell Gerleman** as sales promotion director. **Richard Porter** will assume Gerleman's former responsibilities as sales technician in Michigan, Ohio and northern Indiana.

Charles E. St. Thomas has been named manager, advertising and sales promotion at the Carboloy Department of the General Electric Company.

Assistant to the general manager and manager of the control section of the wood preserving division of the Koppers Co. now is **D. A. Mitchell.**

Paul A. Stember, sales manager of Hoffmeister Cabinet Co., Los Angeles, has been elected president of the Southern California Association of Cabinet Manufacturers. Vice-president is **Paul B. Benson. Phillip DeMarco** retains his post as treasurer.

Col. Willard F. Rockwell, who has resigned as assistant to Secretary of Defense Charles E. Wilson, has returned to his position as chairman of the board of directors of the Rockwell Manufacturing Co.

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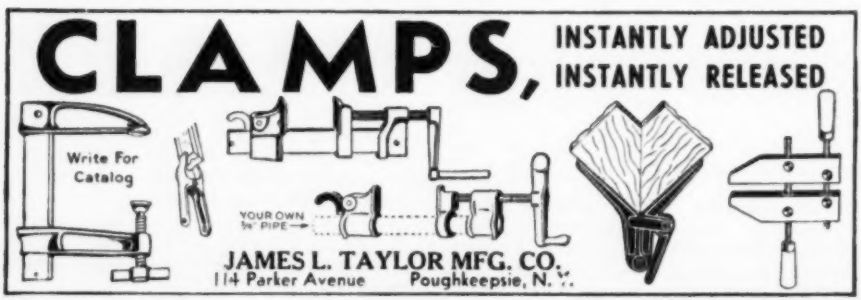

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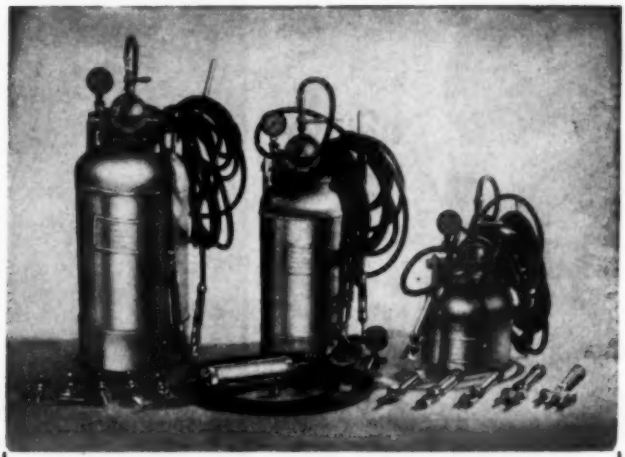

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Concatenated Order of Hoo-Hoo, now is **John B. Egan** of St. Paul who was elected at the organizations 62nd convention.

R. T. Miller has been appointed manager of sales of hardboard products for the Weyerhaeuser Sales Company. He was formerly with the Simpson Logging Company.

Secretary of Commerce Sinclair Weeks has announced the appointment of **Charles F. Honeywell** as administrator of the Business and Defense Services Administration. **William E. Haines** has been named as assistant deputy administrator.

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strength permits prompt handling of assemblies.

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How To Use WOOD FILLERS

By R. S. Quigley

The function of wood filler, as used on furniture, is considered with the particular object of showing how the entire finish may be greatly affected by the quality maintained in the filling operation. The economic advantage of proper filling is pointed out. Preparation of the wood and application methods for better results in filling are discussed. A brief description is given of a method employed to compare results of filling by visual means.

THE purpose of this paper is to consider the functions of wood filler, and the methods of applying it to obtain best results, particularly in the field of wood furniture. It is not intended to cover the subject of formulation of different kinds of wood fillers, nor to discuss the relative merits of the products of various filler manufacturers. Granting that some fillers are better than others, at least for the particular purpose for which they are assigned, it is necessary for the user of filler, in order to get material best suited for his requirements, to give the supplier full information regarding the type of finish, the kind of wood, the finishing schedule, and plant conditions which might affect the finish. If the manufacturer of filler has been given complete information of the requirements to be met and the conditions under which the filler is to be used, it is his task then to produce a filler satisfactory to the user.

Should the filler manufacturer find that the requirements to be met are out of line from standard practices, or the conditions in the manufacturer's plant adverse to good results, he should so advise the user. The next step would then be to make a survey of requirements and conditions to determine whether or not changes in the finish or finishing schedule or in the plant setup would be practical. Many times minor and inexpensive changes can be made which would be far more effective in obtaining good results than for the filler manufacturer to attempt to evolve a freak product to meet extraordinary conditions. Please do not misunderstand the foregoing statement. I do not mean to infer that the manufacturer of filler should not attempt to fit his product

into the user's scheme of things where it is feasible to do so. Nor, do I mean that filler manufacturers should not attempt to produce new and better products and to keep abreast of the ever changing pattern of furniture manufacturing and finishing. However, any radical changes in filler formulation and performance should be the result of thorough research and investigation and testing, which would require considerable time even though successful

Function of Filler

Many articles or dissertations on the subject of protective coatings begin by stating that the purpose of such coatings is twofold;—to protect the surface and to beautify the object to which they are applied. Likewise, it can be said that wood filler has a dual purpose, aside from some possible specialty uses. One function is to provide a smooth surface on which to build a film of protective coatings. The other is to contribute to the desired color effect of the finished wood surface.

In using filler to provide a smooth surface, we do so for economy's sake. Surely it is much less costly to fill the pores and voids in wood in one operation than by using successive coats of film-forming materials. In fact, it is doubtful that a smooth surface over unfilled wood could be arrived at by multiple coats of finishing material, unless each coat were dried and sanded before the application of the following one.

In the color scheme of a finish, filler may have a widely varying role. In planning a finish for a suite of furniture, the color of the filler to be used should be considered at the start, since a filler of the wrong color can ruin an otherwise beautiful finish. In finishing certain types of wood which have a very pronounced figure or grain pattern such as hackberry or ash, it is often desirable to subdue the color of the filler to make it blend into the background color as inconspicuously as possible. For other woods, the attempt is made to emphasize or bring out the figure in the wood by using a filler with some contrast to the base color of the finish. As a rule in finishing furniture of traditional design, the filler is made enough stronger or darker in color than the background that it will not have a gray or muddy appearance. On other types of furniture, the filler may contrast with the background color by being lighter in color or of a different contrasting color altogether. An example of this is the limed oak finish or many of the toned finishes being used on mahogany, walnut, oak and other woods with larger pores. These have been extremely popular during the past two or three years.

In years gone by, fillers were made not only to color the pores of the wood but, also, to stain the surface of the wood. This practice still holds to some extent, especially on oak office and school furniture. However, the usual practice in finishing household furniture is to have the filler color the pores while the surface of the wood is colored by stains, glazes, and often by color in some of the undercoatings such as washcoat and sealer. This latter practice aids clarity of finish, especially in dark finishes, and provides better uniformity of color.

Results of Poor Filling

Too often, we have seen bad results from using too many coats or excessively heavy coats of sealer, lacquer or other topcoat materials. This is not done to replace the filling operation, but usually in an attempt to obtain a smooth surface over poorly prepared and poorly filled wood. The result of such practice might be print marks when the furniture is packed, due to the fact that the heavy coats did not dry properly on the finishing schedule; greater rubbing costs

in cutting down extra material; poorer rubbing qualities of a film not properly dried; the danger of a film checking or cracking if it is too thick; and also the added cost of the excessive amount of material used and time expended.

Not all furniture or woodwork requires a finish of great depth or fullness. Some of the highest priced furniture is purposely partly filled or not filled; even on woods with large pores such as mahogany, walnut and oak. This type of finish usually has little depth and lies close to the wood. However, a good body or depth of finish is required on most of the home furniture being made today. For the past few years, there has been a demand for furniture finish of great depth and high polish, particularly on suites of modern design; and this finish requires a smooth, mirror-like surface. Any open pores or partially filled pores detract greatly from its appearance. Many times such an appearance of "graininess," as it is often called, is laid to shrinkage of the coating materials, whereas the cause is poor filling. One after-result of poor filling is that the effect of the open pores cannot be eliminated in the rubbing process without causing the finish to be rubbed through in places.

It becomes evident then that poor filling can increase costs elsewhere in a finishing operation besides detracting from the appearance and salability of the finished product. The difference in cost of a good filling job and a poor one may not be great. It might mean only the placing of an inspector in the filler department, or perhaps an extra man or two in applying or padding filler.

Another defect due to poor filling may be pinholes in the final finish. Also, one of the most aggravating conditions in finishing wood is bubbling, or blisters forming in the sealer or topcoats. There are, at times, other causes for bubbles or blisters in the topcoat materials, but it has been the writer's experience that at least 90% of bubbling and blistering conditions have been due to improper filling. Any bubbling and blistering in coatings usually disappeared when the filling methods were corrected.

So far, this discussion on results in filling has dealt with the filling of the pores of the wood. There are also other phases to be considered. Filler not properly cleaned from the surface can cause a muddy or gray appearance in the final finish or obscure the figure of the wood. Filler improperly dried before coating may leave a grayish pore color which would detract from the clarity of the finish and likewise cause a muddy appearance. Aside from the harm to the beauty of finish caused by incorrect drying and poor clean up of filler, these faults in application may adversely affect the adhesion or toughness of the total finish.

Application Methods

In attempting to prescribe the best methods for applying filler, it will be necessary to repeat good advice which has been given before by others, and much of which seems commonplace. However, there are certain phases of the process which should be particularly emphasized. Assuming that the user has the proper filler for the job, the various steps to be considered in applying the filler are as follows:

1. The preparation of the surface over which the filler will be applied.
2. Thinning and application of filler.
3. Padding in filler.
4. Clean up after padding.
5. Drying of filler.

1. Preparation of the Surface: The usual surfaces over which a filler is applied are: bare wood (sized or unsized), a wash coat on bare wood, a stain or toner, or a stain or toner which has been washcoated. The main requirements are that these surfaces, whether

they be the wood itself or some finishing material such as stain, toner or washcoat, be properly dried and be as smooth as possible. To have excessive moisture in the wood, or solvents retained in finishing materials beneath the filler is to open the door for ultimate trouble in the final finish. This may show up as lack of adhesion of the coatings, poor filling, a cloudy gray finish, blisters or all of these defects. The surface should be smooth so the filler will cling only in the pores of the wood, leaving the surface clean. It is impossible to clean off filler from a rough surface without removing some which should be left in the pores.

When finishing woods of soft texture, particularly those species which do not sand readily to a firm, smooth surface, it is often advisable to size before beginning the finishing operation. This is especially true when filler is to be applied to the bare wood. The size, usually animal or hide glue, although other materials such as shellac or so-called bleaching lacquer may be used, is designed to stiffen the loose fibers on the surface of the wood so that they may be cut off cleanly when sanded. Also, by providing an even firm surface, sizing causes the wood to absorb color from stain or filler more uniformly than if it were unsized.

Glue is the most common substance used for sizing. It is applied by various methods such as spraying, sponging, roller coating or brushing. It is most important that the right amount of glue is applied; that it is applied evenly; and that it is thoroughly dried before being sanded. The customary practice is to make a size by thinning one part of cabinetmaker's hot liquid glue with from eight to eleven parts of water; the cabinetmaker's glue usually being two parts of water to one part of flake or ground glue. It has been the writer's experience that ten or eleven parts of water is better than eight parts of water to one part of liquid glue. This provides sufficient water to wet and raise the fibers of the wood and to dry sufficiently fast to stiffen the fibers while they are still standing. Heavier applications of size tend to retard drying, fill the sandpaper, and partially fill the pore of the wood, which is usually not desirable. A satisfactory method is to apply warm size (for better penetration and drying) evenly over the surface of the wood with a sponge.

Washcoats are usually used over stains or toners before filling, although in many instances the filler is applied directly over stain or toner. A washcoat may be said to be a thin coating of heavier substance or higher solid content than a size coating. It is generally made from shellac thinned with alcohol, or sealer or lacquer thinned with lacquer reducer, and may vary from 4% to 8% in solid content. Two main purposes of washcoats are to prevent filler, which is applied over it, from staining or darkening the surface or flake of the wood; and like a size coat, to stiffen and harden the fibre of the wood so that it may be sanded to a smooth even surface. The use of a washcoat was quite essential in the past when water stains were commonly used, due to the fact that water stains raised the grain and roughened the surface of the wood. Unfortunately, so-called non-grain-raising stains often belie their name in humid weather due to their hygroscopic characteristic; hence at times they also raise the grain of wood. It has become more or less standard practice, therefore, to use a washcoat and a sanding operation between the stain coat and the filler. For this purpose, when it is to be used over water stains or non-grain-raising stains, I prefer shellac as a washcoat rather than sealer or lacquer. This is because the alcohol in the shellac washcoat forms a

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constant boiling mixture with any moisture that might be present in the stain. The moisture then evaporates with the alcohol and is thus removed; which is not the case with sealer or lacquer washcoats, whose solvents are immiscible with water. If there is moisture present in the stain coat, and there usually is with non-grain-raising stains when used under conditions of high relative humidity, a shellac washcoat will produce a clearer finish than a sealer or lacquer washcoat. On the other hand, shellac washcoat dries slower than sealer or lacquer washcoats, and for that reason may not fit as well into fast finishing schedules. For a washcoat over a toner made from a nitrocellulose lacquer base, a sealer or lacquer washcoat is recommended because of faster dry and better bond between like materials.

Washcoats are used on bare wood before filling, mainly when it is desired to color the pores of the wood with a minimum staining of the flake or surface of the wood.

It is necessary that washcoats be thoroughly dried in order that good sanding and good filling may be obtained. Washcoats not thoroughly dried before the application of filler will pick up color from the filler, causing lack of clarity in the finish. Also, they will cause poor filling and poor clean up of filler and may be a source of further trouble such as bubbling and blistering in topcoats.

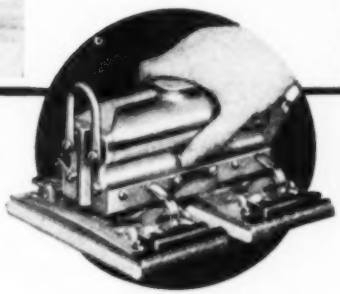
2. Thinning and Application of Filler: The standard practice for thinning filler is to use a petroleum distillate such as V. M. & P. naphtha, mineral spirits, or so-called white gasoline. Although some finishing rooms still use white gasoline, most use V. M. & P. naphtha or a mixture of it and mineral spirits. V. M. & P. naphtha is to be preferred over gasoline because it can be bought on a specification basis and will be supplied within close limits to that specification for specific gravity, distillation range and solvency; whereas white gasoline has been found to vary considerably between succeeding shipments. Also, the use of white gasoline presents a greater fire hazard. Mineral spirits, being slower in evaporation than V. M. & P. naphtha is normally too slow to be used alone. However, it is useful to mix with V. M. & P. naphtha in order to adjust the evaporation rate of the thinner to meet varying climatic conditions. This is especially true in conveyorized finishing rooms where there is a definite time limit between the points where filler is applied and where the rubbing and padding begin; since for good filling, the filler on the surface of the wood should dry down to a certain point, as will be noted later, when it is rubbed and padded in. At the present time, V. M. & P. naphtha and mineral spirits are available in almost every locality. Mineral spirits is also known as Stoddard solvent or may be called dry cleaner's naphtha.

The amount of thinner to be used may depend upon the method of application, the type of wood and kind of finish or on local plant conditions. The opinions of different finishing-room foremen vary considerably on this subject. It might require some experimentation to determine the amount of thinner which will produce the best job.

Filler may be applied by brush, spray or dipping. For large pieces of furniture, such as case goods and large tables, it is customary to spray or brush or, in many situations, both. For smaller objects, such as chairs or novelty furniture and small tables, it is common practice to dip the pieces in a tank of thinned filler.

For spraying, the proportion of filler to thinner may vary from five pounds of filler to a gallon to ten pounds to a gallon. Woods that are comparatively

better finishes can mean bigger sales at the market...



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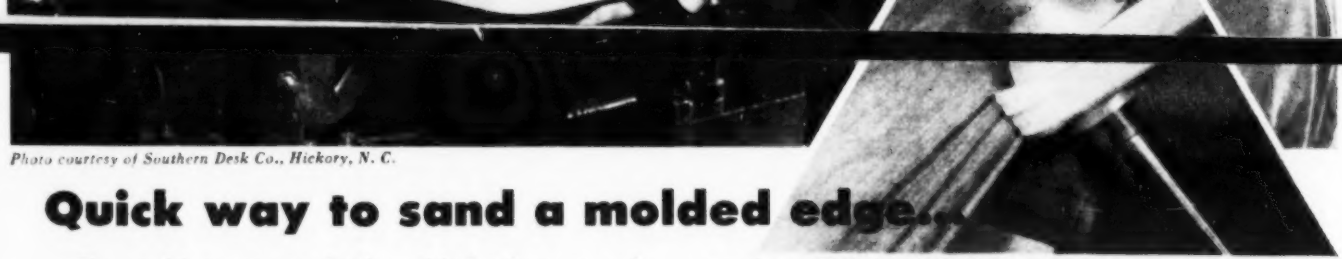

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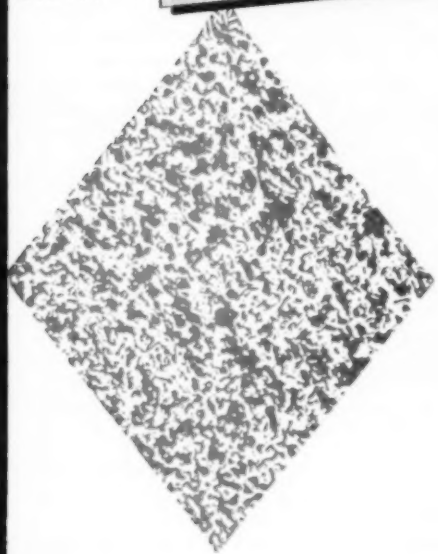

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- Permits use of cheaper base materials in products
- Preparation time eliminated or reduced to a minimum
- Comes ready-to-use in multicolors or in solid colors for intermixing by the user
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- Particularly valuable in finishing porous materials which tend to absorb ordinary finishes

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easy to fill will not require as heavy a mixture as those with large pores. More thinner is used for spray application than for brushing, because part of the thinner is lost by evaporation before it reaches the object to which it is being applied. The thinned filler should be strained before being sprayed.

For brush application, the proportions of filler to thinner may vary from seven pounds to the gallon to fourteen pounds to the gallon, depending again on the wood and the type of finish. If it is used too thin, there will not be enough filler deposited on the surface of the wood to fill up the pores when it is padded in. If used too heavy, it will be wasted, will cause the use of too much tow, moss, rags or other rubbing materials, and will be harder to rub and pad in.

In applying filler by dip on fine textured (close-grained) woods, such as gum, poplar, beech or tupelo, a mix of from four to six pounds of filler to a gallon of thinner is usually heavy enough. On coarse textured woods with large pores, the mix should be heavier, in which case it may vary from five to eight pounds of filler to a gallon of thinner. For best results, dip tanks should be constantly agitated to minimize settling of the heavier pigments.

A pressure tank equipped with an agitator is recommended for spraying filler. Low air pressure, of from twenty-five to thirty pounds at the gun, with about fifteen pounds tank pressure, should be used in order that the filler be applied wet with a minimum of evaporation of thinner during the spraying process. If the filler is sprayed from a gravity feed bucket, slightly higher air pressure at the gun, such as from thirty to thirty-five pounds may be used.

An E tip and needle with a No. 30 air cap is recommended when using a gravity feed bucket, and an E tip and needle with a No. 704 air cap when using a pressure tank. However, many prefer a No. 30 air cap for either gravity or pressure feed as it delivers a wetter coating of filler.

The filler should be applied quickly, evenly, and heavy enough that a thick pad of filler will be formed under the tow, moss or felt, or whatever material is used for padding the filler into the pore of the wood. It is good practice immediately following the spraying of filler to brush it across the grain of the wood using a long bristle brush. This not only assists in distributing the filler evenly over the surface, but breaks up any small air bubbles in the wet film due to the spraying operation, and allows the filler to run down into the pores of the wood.

3. **Padding in Filler:** The next step in the filling operation is the rubbing or padding of the filler into the wood. There are differences of opinion as to the proper time to start padding. Under normal conditions, the padding should begin soon after the filler flattens down; that is, when the wet appearance has disappeared from the surface but while it is still moist and soft beneath the surface.

There are various materials used to pad the filler into the wood, such as tow, sea moss, burlap and felt. The material should be soft enough and fine enough textured that it does not scratch the surface nor dig the filler out of the pores. A padding machine consisting of felt blocks mounted on a slowly revolving wheel does an excellent job of preliminary padding. Such a machine is moved back and forth across the surface while the revolving pads force the filler into the pores. Likewise, when the padding is done by hand, a circular motion, but moving across the grain of the wood is recommended.

The point to be emphasized is that the purpose here is to apply enough

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pressure so as to force the filler down to the bottom of the pores. This requires bearing down, especially if the padding is done entirely by hand. Sometimes, the operation is referred to as wiping filler, and too often it amounts to just that. Filler can be wiped off so that the pores, appear to be filled level with the surface of the wood, yet it may not be packed firmly to the bottom of the pores. In such a case, when a heavy coat of lacquer or sealer is next applied, the solvents penetrate through the crust into the cavity beneath. Vapor is formed below which pushes out forming a bubble or blister in the coating or leaving a blow hole or pinhole in the film.

After the excess material has been removed in the preliminary padding either by machine or by hand, the surface should be gone over again by hand with a soft pad well covered with filler to make certain that each pore is packed full.

It is well known that the pores of different woods, as of various cuts of the same wood, differ greatly in size and shape. Some woods are known to be much harder to fill than others. Some pores are long and narrow and yet may be shallow or deep. On swirly cuts, there will be much end grain with small but deep pores. In the past, double filling was oftentimes practiced on hard-to-fill woods. This was expensive and time consuming as it meant two complete operations of applying padding, clean-up and drying of the filler. Also, while it might have been some improvement over a single filled job, it many times did not give a satisfactory job. This was probably due to the fact that just enough hard dried filler was left in the pores from the first filling to prevent anchoring the filler into the pores the second time over.

However, there is another method of double filling, sometimes called pre-

filling, which does not cost a great deal more nor consume much more time than the ordinary single filling operation. The effective results obtained in eliminating "graininess," increasing the apparent build of coatings, and often in solving an exasperating condition of bubbling or blistering in coatings, have at times been almost amazing. Yet many seem to have no knowledge of this method or of the results obtained.

In this method, the filler is applied and given a preliminary padding usually with a padding machine. The piece then goes at once to a station where filler is applied again. This time a thorough padding operation takes place followed by careful clean up. The filler then is allowed its normal drying time before being coated. The theory behind this is that while the filler from the first application is still soft and workable, the added filler from the second application pushes it down and completely packs it into the pores. One application is usually by brush and the other by spray.

Oftentimes, one extra workman, with the use of a padding machine, can perform the preliminary application and padding operation. However, whether one, or two, or even three extra men are required, the improvement in results more than justifies the added cost. In fact, in most instances, savings in the total finish will be far greater than the added cost of this method of double filling, while the improvement in the finish is usually remarkable.

4. Clean Up After Padding: After the padding operation has been completed, the filled surface should be wiped across the grain of the wood to remove any excess of filler, and to make certain that the surface is left clean. Tow, or some heavy cloth, not too coarse, and preferably one that has been washed to remove sizing will do. Following this

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cross-grain wiping, the surface should be wiped gently with the grain of the wood with a softer cloth to remove any cross-grain streaks.

The final operation is to clean out corners, fluting, route lines or other hard-to-reach areas. A filler pick brush made of fibre bristles is satisfactory for this purpose on fine textured (closed-grained) woods such as gum, maple, or cherry, but should not be used on coarse textured woods with large pores, as the bristles will remove the filler from the pores. Nor should filler be blasted out of corners or crevices with an air duster, as that method is quite certain to blow the filler from the pores of the wood.

This paper was originally presented at the Forest Products Research Society's Annual Meeting, 1953, and is reprinted with permission.

5. Drying of Filler: To keep pace with the accelerated finishing schedules of recent years, various methods have been pursued in the effort to produce faster drying fillers. In some of these, fast drying oils or varnishes, or resins that dry by evaporation and polymerization have replaced the linseed oil and dryers of old-time fillers. In others, the vehicle solid content has been reduced to produce a filler which can be coated after a shorter duration of time. In still another kind, the liquids of the filler have little drying action, but are compatible with the solvents of the coating to follow. Although these have been successful for certain jobs and for certain colors, it is the writer's opinion that there is still much to be accomplished in making a perfect fast drying filler for normal air dry conditions. However, with the use of ovens or heat tunnels, excellent filling can be obtained on comparatively short drying schedules with adaptations

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of the old overnight-dry type of filler. It is believed that intensive research and development work on fillers is now being carried on by many manufacturers of finishing materials.

In considering the proper drying of filler, it is necessary also to take into account the coating which is to be applied over it. A sealer or lacquer with a normal composition of solvents should, when applied, wet into the top surface of the filler in the pores of the wood. This action, assuming that the filler has the proper color and strength of color, will produce a sharp, clear pore color. If the filler has dried too hard or if the solvents in the coating are too weak, a lack of bonding at the interface will result in gray or shiny pores. If, on the other hand, the filler is not sufficiently dry or the solvents in the coating are too strong, a puffing or heaving of the filler will take place. This is often confused with "orange peel" in the coatings. Many times lacquers or sealers have been condemned for poor flow or "orange peel," when the fault was improper drying of the fillers.

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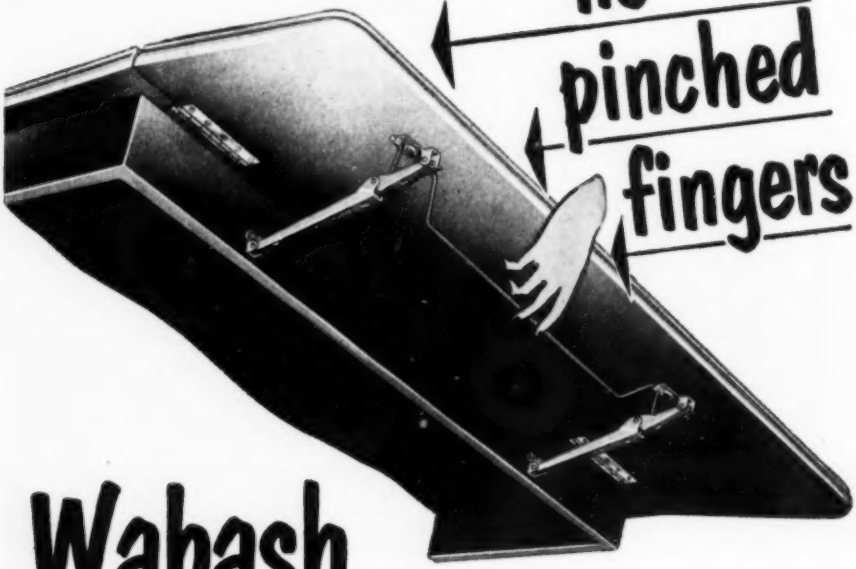

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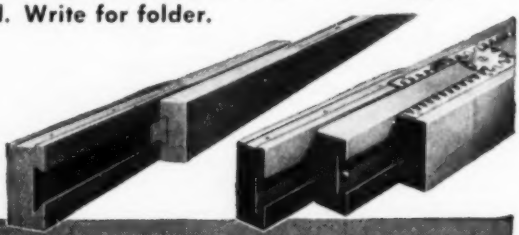

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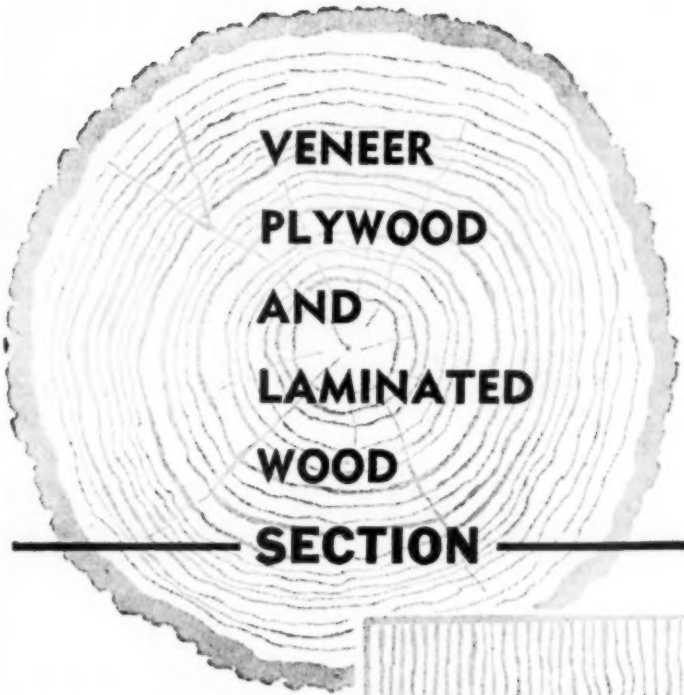

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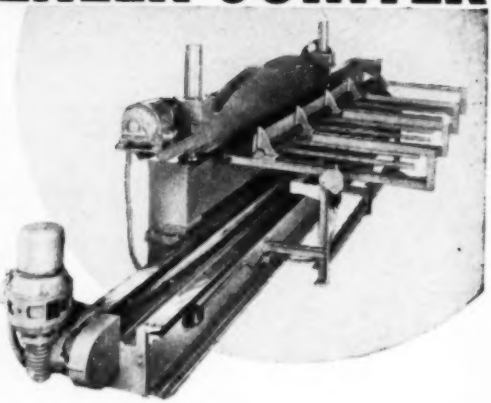

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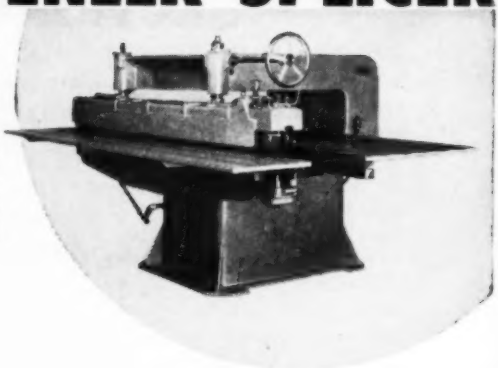

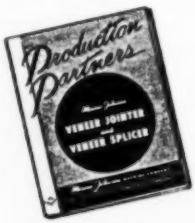

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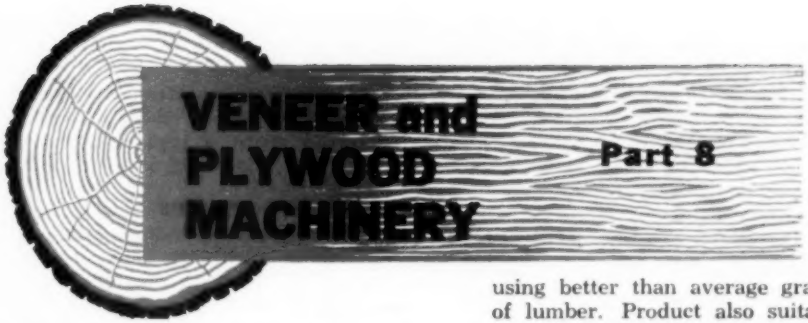

Dimensioning Lumber

By Thomas D. Perry

THE machines required to properly dimension rough lumber, between the dry kilns and the core clamps, in preparation for gluing the strips into core blanks (or core plates as they are sometimes called) involve several operations: rip sawing, cutoff sawing, rough planing and jointing edges. The procedure, or sequence of these operations is by no means standardized, since it depends on the grade of lumber, the quality of core blanks required, and the equipment available. As an example, the dimensioning of gum lumber that is distinctly warped, with many areas of twisted grain direction, may be quite different from that of yellow poplar, which is reasonably flat and straight grained. Again a high grade of lumber cores for table or desk tops, which must be free of defects, with clear or banded edges and are to be jointed, may require a different procedure from average quality core blanks, in which minor defects, butted end joints and sawn edges are permissible.

However, there are three procedures, or sequences, that will meet most requirements, although special conditions may warrant some modification in these procedures. They are:

A. For highest quality lumber cores using better than average grades of lumber. Product also suitable for solid (non-plywood) tops.
   a. Cutoff, full lengths only.
   b. Rip to random widths.
   c. Rough planing to remove wind.
   d. Joint sawn and raw edges.

B. For good grade of lumber cores using a medium grade of lumber.
   a. Cutoff, full lengths only.
   b. Rough planing to remove wind.
   c. Straight line rip to random widths, in lieu of jointing.

C. For average grade of lumber cores using relatively low grade lumber.
   a. Rough plane both sides to reveal defects.
   b. Gang rip to standard widths.
   c. Cutoff, to full and butt lengths.

Perhaps the best way to present the woodworking machines available for each of these operations will be to describe each type, referring to its place in any of the above procedures.

Roughing Planers to Reveal Lumber Defects

These roughing planers (not illustrated) are sturdy double surfacers, taking the lumber direct from the kiln car and before any sawing. The thickness, usually just a bit under one inch, should be set to clean off the surfaces, as far as practicable, leaving enough stock for the final planing (to approximately 11/16") after the core strips are glued together. This rough planing will

take off the high spots and clearly reveal any low areas which may not have adequate thickness for the cores and may have to be set aside for thinner cores. Knots, splits, doze and other natural and kiln developed defects will become apparent, and so far as necessary, can be eliminated in either of the sawing operations.

This roughing planer, as indicated in the procedures, C-a, can be set in tandem before the gang rip saw, leaving enough room to feed the rough planed boards into the gang rip saw for the most favorable cuttings.

Gang Rip Saw to Standard Widths

This piece of equipment is required in procedure C-b, and in none of the other procedures. Since this method requires accurately cut standard widths, that can be end butted, it is important that special attention be given to the setting of the saws and the pressure feed rolls. There are a number of width combinations that can be used, one of which is outlined:

A	B	C	D	E	F	G
1½″	2½″	3″	3″	3″	2″	2″

These can be selected for various widths of rough boards as follows:

11″ use CDEF
10″ use DEFG or ABCD
9″ use CDE
8½″ use BCD
8″ use DEF
7″ use ABC or EFG
6″ use CD or DE
5½″ use BC
5″ use EF
4″ use FG or AB

It will not take an experienced sawyer long to learn where to flip any board to get a maximum of good strips and a minimum of waste edgings. Saws must be kept sharp and well jointed to produce gluable edges; there must be ample kerf clearances and the feeding mechanism must keep the strips in accurate alignment.

Since this setup requires considerable floor space to handle the full length boards and strips, a typical layout is indicated in subdivision IV of Fig. 16.

Planer to Remove Wind

This is a particularly important step in producing quality lumber cores, so as to permit subsequent straight and square edges for all core joints, whether made on a straight line rip saw or a jointer. Its use is indicated in procedures A-c and B-b. In essence it requires a double planer, making the under cut first to provide a true surface and the top cut later, against a rigid flat bed over which the properly planed under surface slides. The pressure for the under cut is provided by spring held fingers, which travel with the wood, and prevent any rocking of the board while the lower knives are "in the cut." When the board emerges from the second planer head it has two true surfaces and is of uniform thickness. The thickness setting for core stock is as generous as the lumber will permit, not necessarily to completely clean each surface, but to establish a true surface on both sides, which will serve as a dependable guide for the square edges which are to comprise the joints. Enough stock must be left for the final surfacing when the core strips are glued together. The usual rough thickness for 11/16″ lumber core stock is a trifle under one inch. This machine, the Oliver Straitoplane is a tandem machine, corresponding to a power feed facing planer followed by a single surfacer and is illustrated in Fig. 1. The lower cutter head for the first surfacing operation can be noted opposite the extension bracket for sharpening, at about the center of the photograph, while the upper cutter head is attached to the motor at the rear of the machine.

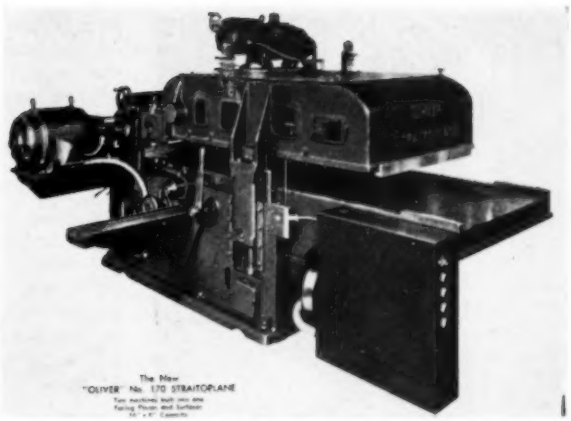

Fig. 1 Infeed end of Oliver Straitoplane.

The finger pressure feed chain, contained within the head behind the name plate, is shown in greater detail in Fig. 2. These spring actuated pressure fingers duplicate the hand pressure exerted by an experienced workman on a facing planer, and insure a flat under surface before the board goes under the second cutter head, which produces an equally flat surface, as well as a uniform thickness.

These machines handle stock up to 36" wide and have an infeed rate of speed that may be regulated between 20 and 60 lineal feet per minute.

Fig. 2. Detail of infeed pressure chain, Oliver Straitoplane.

Cutoff Saws

The cutoff saws described for making lumber cores have a number of individual features, and offer quite a range of choice to woodworkers. They are fundamental in making core stock of all qualities and are represented in procedures A-a, B-a, and C-c.

The characteristics they must have are a quick "in and out" square, cross cut, on a board resting against a back fence and an end stop. The saw blades must be well guarded to protect the sawyer, and must not disturb the location of the board as it rests on the table and is "in the cut," and it must not "throw" any short end cuttings. On short production runs the saw may be manually pulled into the wood, but for large production, hydraulic or pneumatic operation, by means of a foot lever release, will save time and will leave the sawyer with hands free to handle the work.

A modern version of the standard swing cutoff saw is shown in Fig. 3. This design is more compact and rigid, with its back standard supporting the swinging pivot and motor, than the older type with counter shaft bolted to

Fig. 3. Heston & Anderson swing cutoff saw with standard.

the floor joists above. This saw is manually operated and comes in four sizes, carrying an 18″ to 12″ saw blade.

The cross cut saw illustrated in Fig. 4, slides in and out on horizontal ball bearing ways, with automatic stroke (hydraulic or pneumatic) actuated by a foot lever and with a positive return. The saw blade is fully guarded by a cast aluminum hood, in fact the entire moving head, except working parts, is made of rigidly ribbed aluminum castings. The dust chute, below the saw, carries the sawdust to the dust collector system. The capacity of the saw is up to 22″ wide by 5″ thick, and it is well adapted to long production runs.

The third type of cross cut saw has a novel feature, as can be noted in Fig. 5. In this design two saw blades are mounted at the ends of a rotating yoke, which may turn intermittently or continuously. After the board has been placed for the cut, the foot lever gives this yoke a half revolution, during which the top saw cuts through the board and continues down to its other position. No time is lost waiting for the return stroke to clear the stock. This permits rapid handling of the stock for the next cut, and is claimed to substantially increase the cutting volume. In comparison with saws that have a return stroke. Some operators keep this yoke in continuous operation and time their feeding of boards to meet the range of strokes provided, which are from 15 to 60 strokes per minute. Both saws are completely protected and the collecting of sawdust is facilitated by a blow pipe connection in the lower side of the saw guard. This saw is made in two sizes, the largest handling stock 20″ wide by 3″ thick, or 26″ wide by 1″ thick.

The other two types of cutoff saws illustrated have eliminated the sliding head used in Fig. 4 and have substituted link types of motion. The saw shown in Fig. 6 has four pairs of collapsing links, which unfold to carry the saw blade forward horizontally with a minimum of effort. It is returned by gravity to the protection of a safety lock. The saw blade is well guarded above and the saw dust collected in a slot below the cutting line, which provides a connection to the dust collec-

Fig. 4. Diehl straight line cutoff saw.

Fig. 5. Mereen-Johnson automatic cut-off saw. Saw guard plate has been removed.

tion system. This saw handles stock up to 24" wide by 4" thick, and a smaller three line machine has a width limit of 16".

The saw illustrated in Fig. 7 has a single pair of unfolding chain links, pivoted at the top of the head, which carry the saw blade directly mounted on the motor shaft. The result, as the links tend to straighten, is a horizontal forward motion of the saw blade, which, as the links return, reverses in a back stroke and engages a safety hook. Both in and out motions require a minimum of manual pull. This machine is shown without automatic hydraulic attachment, but the machine will shortly be offered with this hydraulic device. A counterpart of this machine is offered with a swivel head for angle and miter cutting.

Straight Line Rip Saws

It is imperative that the sawn edges of core strips, to be glued together, be perfectly straight and square. This rip saw operation, in the procedures outlined above, represents procedures A-b and B-c.

Until relatively recent years it was considered necessary to joint all edges (to be glued) over a rotary cutter head jointer. This removed a minimum of 1/32" from each edge, a total of 1/16" per joint, or more than 2% of the stock from a 3" strip. More often this jointing waste, through inattention, crept up to 4% or 5%. This waste and extra machine operation on the jointer, emphasized the importance of straight line rip saws, which would produce a smooth enough surface for gluing. As a result there are some half dozen makers of modern and efficient straight line rip saws, between which it is difficult to choose.

However, the kerf of a saw cut is seldom less than 3/32", and a jointer will often conserve stock on a core strip that has a good raw edge. Many authorities still claim that a core blank with all edges jointed is preferable to the best saw joints. As a consequence many factories use both straight line rip saws and jointers, to the extent even of combining them in a single joint, and feel that this combination results in a minimum of waste edgings.

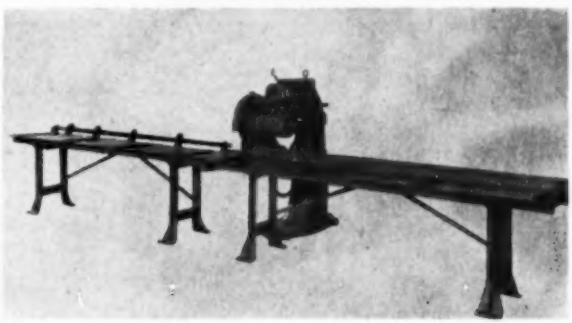

Fig. 6. Mattison cutoff saw.

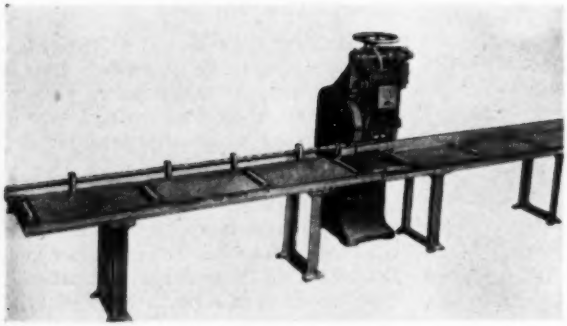

Fig. 7. Oliver Straitline cutoff saw.

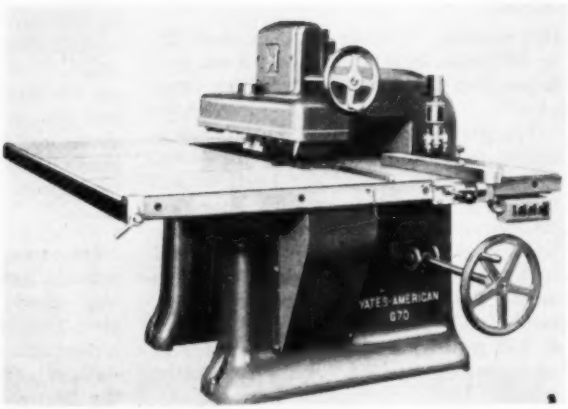

Fig. 8. Yates-American straight line rip saw.

Fig. 9. Oliver Straitline ripper.

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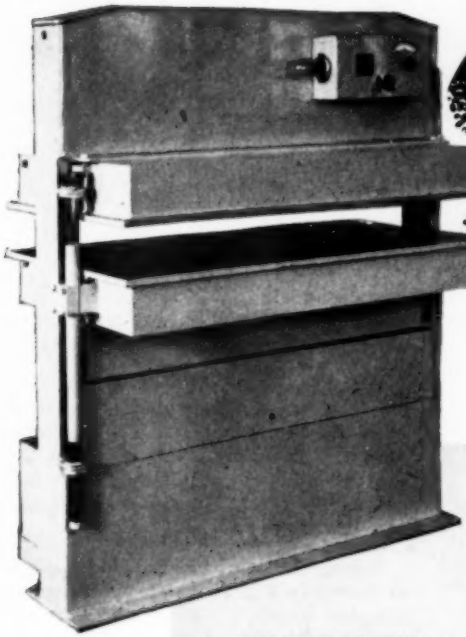

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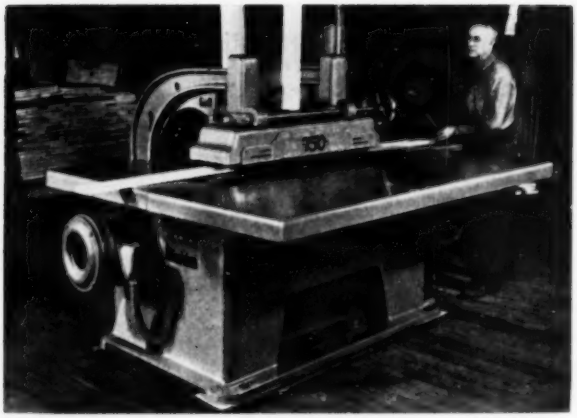

Fig. 10. Diehl straight line rip saw.

The maximum permissible width of core strips has been a matter of considerable debate in the industry. The narrower the strip, if properly reversed, the less the chance of developing warp. As a compromise most authorities feel that 4" is a minimum width for quarter sawn stock, or for flat boards of low density species, which are sawn away from the heart of the log. Under less favorable conditions, 3" is the usual maximum, although even less is desirable in "near the heart" boards from small logs.

Several of the more desirable features in a rip saw will be illustrated, although most of them are included in all of the better makes of rip saws.

Fig. 11. Mattison straight line ripper.

The illustration in Fig. 8 shows an extra edging guide, which drops flush with the table under the weight of a board. This machine has the saw below the table and a split chain on either side of the saw. The kick-back fingers are also clearly shown.

A long shifting lever for guide setting is shown in Fig. 9, which guide can be clamped at any standard width by the knurled handle. This machine also carries the saw blade below the table, where it operates between twin feed chains.

The outfeed end of the rip saw is illustrated in Fig. 10, showing the knurling on the face of the feed chain, and the overhang of the arms which carry the upper idling rollers to hold the stock against the feed chains. This machine has the under hung saw and the split feed chain.

The rip saw illustrated in Fig. 11 has an overhead saw, which the makers consider an advantage in holding the stock down against the single feed chain below by means of the cutting action of the saw. It also has (not shown)

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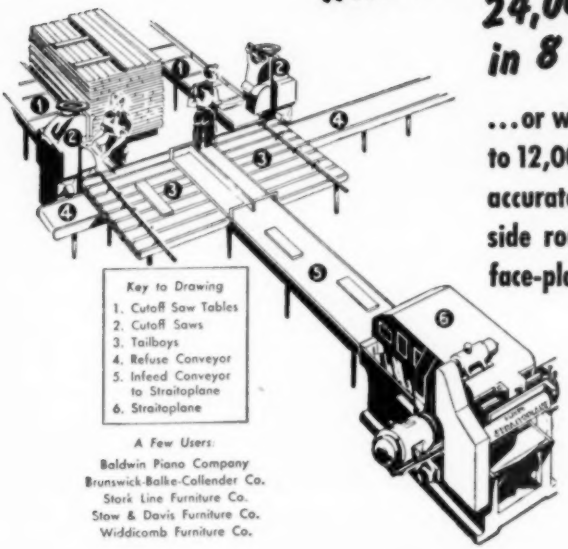

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2. Cutoff Saws
3. Tailboys
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6. Straitoplane

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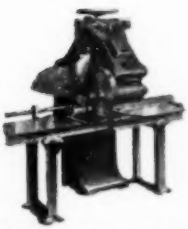
...or with 2 men from 6,000 ft. to 12,000 ft. in one day. Stock is accurately sawed to length, one side rough surfaced, other side face-planed to correct dimension

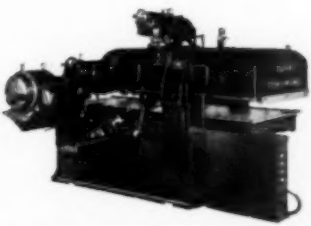
• Using an "Oliver" conveyorized layout, two men running two Cutoff Saws and one man to tend the Straitoplane can turn out up to 24,000 ft. a day. With one man at a Cutoff Saw, up to 12,000 ft. a day.

• This system is most efficient for processing rough lumber from bunk through surfacer. It gives flat, uniform stock. Cuts manpower, speeds production. Avoids unpiling and repiling on trucks.

• The "Oliver" layout can be changed to meet your special needs. If you produce 4,000 ft. or more a day, get all the facts on this Conveyorized Rough Mill system.



"Oliver" automatic Cutoff Saw makes up to 43 cuts a minute. Hydraulic operated. Has wide capacity. Makes cuts without .005 inch variation.



Straitoplane removes warp or wind from stock, rough surfaces one side, face-planes other in one operation. Takes stock to 36" wide, ½" to 6" thick, from 16" up in length. Feed: 20' to 60' or more a minute. Processed stock is straight, flat, uniform.

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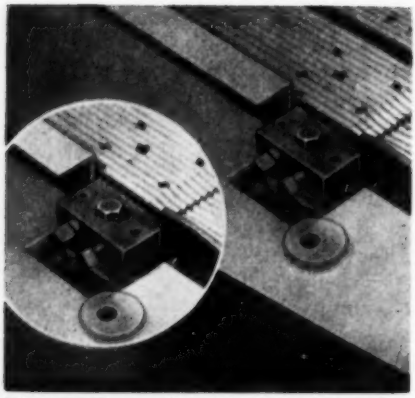

Fig. 12. Grooved chain raceway in Marion straight line rip saw.

fixed stops for the guide at an edging cut and at a standard width, and a "floating" guide for intermediate widths.

The details of one of the chain races on a straight line rip saw, are pictured in Fig. 12, which, however, may be somewhat modified in other makes of rip saws. The undersides of the chain links have corresponding grooves to insure that every piece of lumber on the chain travels in a perfectly straight line. All of the rip saws illustrated have a series of non-driven rolls, above the chain, which can be adjusted for pressure and thickness. All rip saws are equipped with speed regulators on the feed chains, which usually range from about 50 to 200 feet per minute.

Edge Jointers

It has been pointed out that some woodworkers prefer all jointed edges, while others combine straight line rip sawing with jointing. It is undoubtedly true that, in making lumber cores, the straight line rip saw has increased in importance, but the jointer is still an essential item in any well equipped core department. In the list of procedures the jointing is A-b, with jointing optional in B-c.

Only automatic feed jointers are adapted to core work. These machines carry the core strips, on edge, between a feed chain against one surface of the board, and non-driven pressure rollers on the other. The rotating cutter head is below on a horizontal shaft. There are two lines of travel, one for each edge, and automatic devices are often used to turn the core strip over between the lines of travel so as to eliminate one operator. Two similar types of edge jointers are shown in Figs. 13 and 14, in which the central feed chain serves both the going and the return trip, while the pressure rollers are on

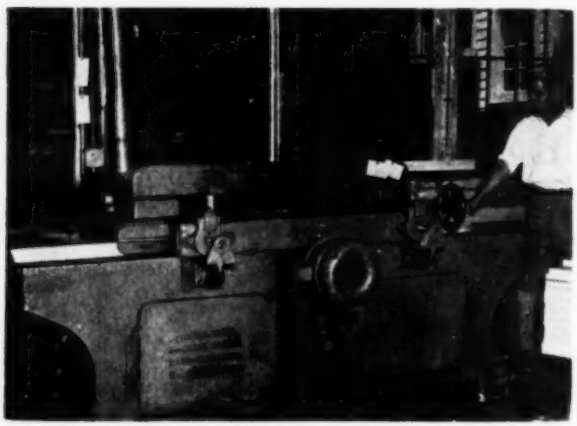

Fig. 13. Diehl edge jointer.

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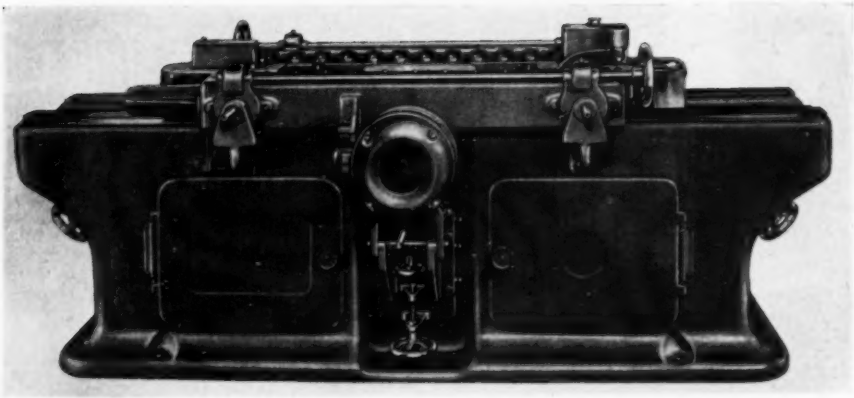

Fig. 14. Oliver edge jointer.

the outside. The lineal feed can be regulated between approximately 30 and 100 feet per minute, according to the character of the work desired.

There are still a few woodworkers who prefer a tongue and groove joint in core stock, but it sacrifices at least 5% of the width of the strips, and the remaining argument in its favor is that tongued and grooved edges facilitate centering in glue clamping. Jointers can be equipped to cut the groove on one side and the tongue on the other, but the practice is pretty much outmoded.

Another type of duplex jointer is shown in Fig. 15, in which the feed chains are on the outside, with two series of pressure rollers in the central area. This is a shorter machine than the others, and is particularly adapted to small sized work, and can be operated at higher speeds, if desired.

Machine Layouts

Efficient plant layouts for the machines described here will vary widely with the production volume, the space available and the character of the work. Several suggested layouts are shown in Fig. 16, starting at the lumber lift for

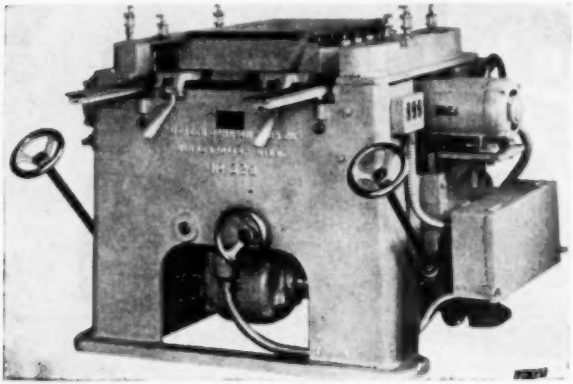

Fig. 15. Mereen-Johnson edge jointer.

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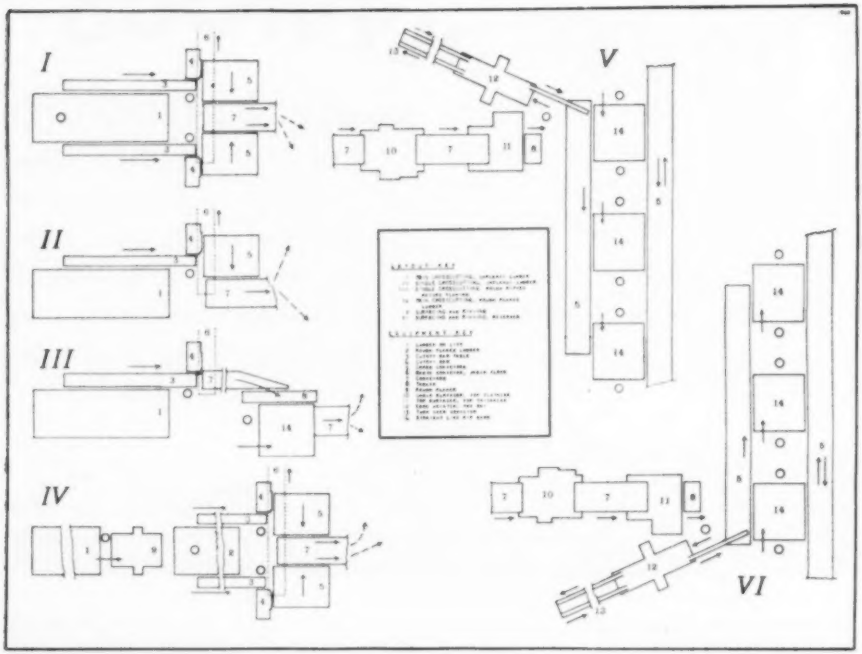

Fig. 16. Typical layouts for lumber core departments.

kiln dried lumber and carrying the stock through the various intermediate stages, until it is ready for the matching table and the glue clamps.

Conclusion

The machines briefly described in this article are special purpose machines and differ from those in previous articles in this series which were mostly special purpose machines, limited largely to veneer and plywood production. The larger number of these general purpose machines has limited the space that can be devoted to each, but it is hoped that this review approach will give the overall picture to interested readers.

Space does not allow adequate descriptions of many phases of design, construction and operation in the many types of machinery used in dimensioning lumber core stock. Interested readers are referred to the following manufacturers for more explicit information. These companies have been helpful in supplying the data and photographs for this article.

G. M. Diehl Machine Works, Wabash, Indiana.

Heston & Anderson, Fairfield, Iowa.

Marion Machinery, Foundry & Supply Company, Marion, Indiana.

Mattison Machine Works, Rockford, Illinois.

Mereen-Johnson Machine Company, Minneapolis, Minnesota.

Oliver Machinery Company, Grand Rapids, Michigan.

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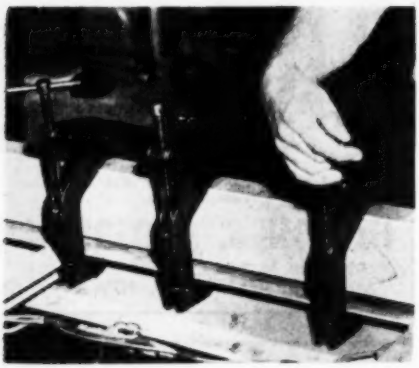

usually found in most methods of deep throat clamping. Exceptional reach is accomplished without sacrificing strength. The new unit weighs but 4 lbs. and is produced from roll forged steel. It combines the best features of standard drop forged "C" clamp and a toolmaker's parallel clamp. By the use of a torque converting, spring-bearing trunnion in the new clamp, distorting, twisting action is completely eliminated. The trunnion also absorbs vibration, thus insuring a firm, steady grip throughout milling, routing and shaping operations. There is no unsupported screw or loose pad to "walk" off the center when pressure is applied against the anvil. The horizontal position of the screw (at all openings) provides access to the work area.

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According to Tom Henry, head of the firm and chemical engineer who created the formula, the polish contains a special combination of scientifically blended ingredients, and is able to remove alcohol, water, ink, coffee and other similar stains as well as make surface scratches disappear. In the majority of cases, he reports, the polish has eliminated costly refinishing charges. Fine double-0 steel wool impregnated with the polish is rubbed lightly with the grain until the wood is free of all scratches, gum, dirt or rings. The original luster of the finish is then obtained by polishing with a lint-free cloth.

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Features include: rigid, seasoned cast iron frames with integral feet; deep, integrally cast fins providing extra heat dissipating surface resulting in cooler operation; double-width prelubricated sealed ball bearings require no greasing or cleaning for normal life; correct quantity of lubricant is sealed in . . . dirt and moisture is sealed out. Electrical characteristics: 2 or 3 phase, all standard frequencies and commercial voltages below 600 V, as required. These motors can be supplied for vertical, wall or ceiling mounting, as well as standard horizontal floor mounting.

HYDRAULIC LOG TURNER

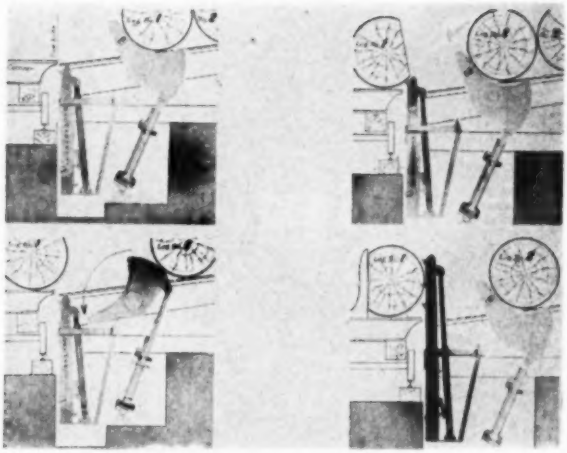

Illustration shows in top sketch how log lays in arms of the stop and loader. Log rolls in, due to slope of skid. Bottom, left, even large logs can be kicked onto the carriage with ease. Second log is held back until its turn. Top, right, log turner comes forward out of deck and moves upward, beginning to turn log on carriage. Bottom, right, turner holds log against knees for dogging.

Richardson Hydraulic Machinery Company, Metropolis, Ill., manufacturer of hydraulic sawmill equipment has announced a new improved model of its hydraulic log turner and a new stop and loader.

Both pieces of equipment are operated by a hydraulic pump which operates with V-belt drive from the saw mandrel or a 5 h.p. electric motor.

The hydraulic log turner is somewhat similar to steam "niggers" in operation, except that it takes a much shallower pit for installation, needs no steam, and costs less, it is claimed.

With the hydraulic log turner the sawyer can: load logs from skid to carriage; turn logs and cant to any position on the carriage; hold logs against knees for dogging; shove logs, set works and knees back in proper line for sawing; stack flitches back on carriage on top of one another and line them up for sawing 2 x 4" and other sizes.

Simple lever controls, similar to a sawyer's lever, control the operation of the log turner. Two different size standard models are available—larger sizes are built to specifications.

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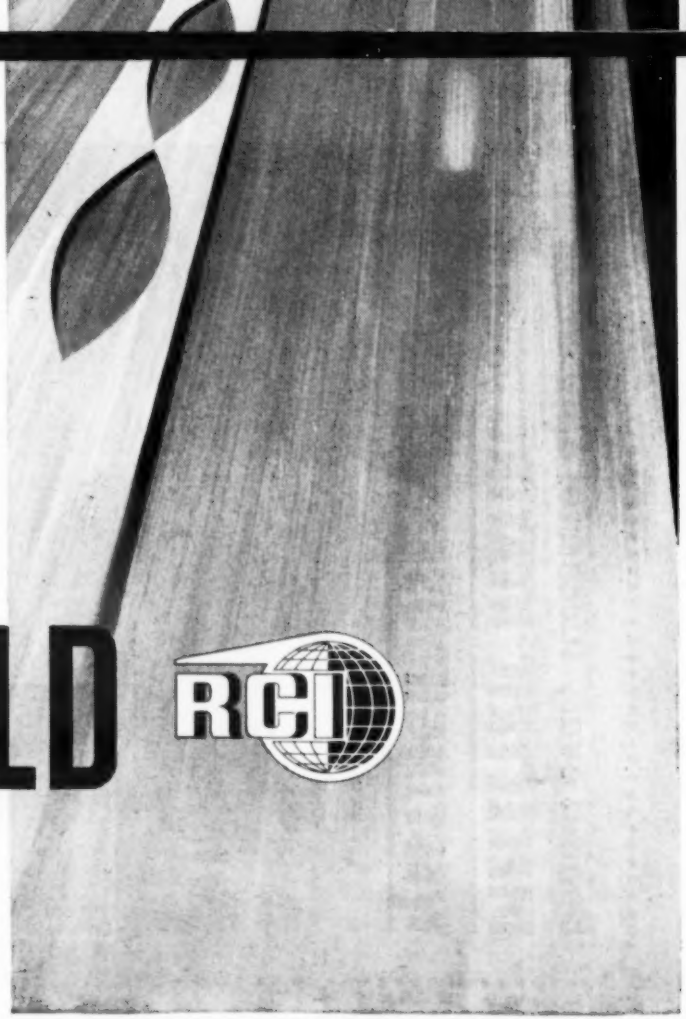

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HONEYCOMB CONSTRUCTION IN MILITARY TRAILERS

By B. Del Mar and H. Stumpf

THIS article will describe certain design requirements for military van type trailers, and the advantages and limitations of honeycomb core panel type construction for these vehicles.

The constant search for stronger, lighter structural materials and construction methods has focused considerable attention on the possibilities of honeycomb core structural panels. Panels incorporating a lightweight core, separating and bonded to thin high-strength facing materials, are structural units with very high strength weight and rigidity-weight ratios. Such panels, with their neat appearance, insulation properties and simplicity of assembly, are suitable to many applications in the design of airborne equipment. One such application is in the design of van type trailers which are required to house electronic equipment and the necessary operating personnel. Such vehicles may be required to house ground control equipment used for directing aircraft or missiles or for the detecting and tracking of targets. The operational requirements imposed by such specifically designed equipment can seldom be satisfied if contained in "stock" vehicles. The special requirements associated with the successful operation of this equipment will often indicate the necessity of a specific van trailer design and such design may incorporate honeycomb core panels to good advantage.

Of all of the so-called "sandwich construction" panels, those incorporating a manufactured honeycomb core material appear to be the most promising. Honeycomb core materials are manufactured from thin sheets into a bulk assembly of uniform structural shapes capable of withstanding shear and compression loads. Most of these have been hexagonal in shape, resembling honeycomb cells. There are several core materials now being manufactured in quantity. Among these are 4 oz. and 8 oz. cotton duck cloth, 60, 70, 110 and 125 pound Kraft paper, Fiberglas cloth and .002 through .006 aluminum foil. A number of other materials are being manufactured experimentally. These materials are manufactured into honeycomb cores having a variety of cell pitches, with ¼" and 7/16" being the most common. The paper and cloth are impregnated with resin which is cured to hold the core shape. Panels can be fabricated by facing the core with metal, wood, plastic, cloth or paper sheets. The facings can be bonded to the honeycomb with any one of a variety of commercially available resins. These core materials are available for any desired thickness of panel. However, the majority of design requirements have been met with panels less than five inches thick. This has dictated mass production policies. The available mass produced cores, also are limited in length and width by existing production equipment. The core materials are produced in sizes considerably less than that of standard facing materials. Splicing of core seg-

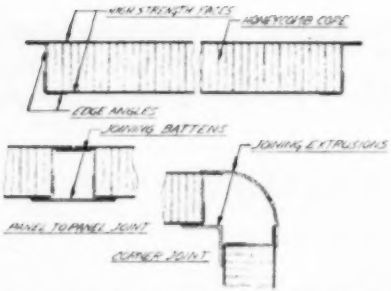


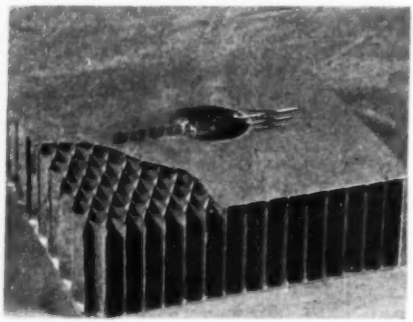
Fig. 1. Typical panel and joint configurations.

ments, therefore, is required for their fabrication into panels.

Honeycomb core material, when bonded into panels, is capable of working the face materials up to their yield strength. To do this the core carries shear loads, resists tension and compression loads perpendicular to the plane of the panel, and stabilizes the faces, preventing premature buckling. For the higher strength cores the bonding of the components of the panel is increasingly critical.

Shear and compression strengths of core materials vary almost directly with the weight of the core; the heavier core being the stronger. Some relative strengths, as obtained from published data are shown in Table I.

Rigidity in honeycomb core panel construction is a function of the total panel design configuration; with a core material weight-rigidity ration probably highest for magnesium foil core and then in decreasing order, aluminum foil, impregnated paper and impregnated cloth. Honeycomb construction shows a considerable advantage over fabricated wood or metal panels on a rigidity-weight basis. This is indicated in Table II.



Courtesy Douglas Aircraft Co., Inc.

Fig. 2. Specimen—paper honeycomb core with aluminum alloy faces.

The insulation properties of a given thickness panel are a function of the core material used, the thickness of the sheet used in its manufacture and the size of the reticule of each honeycomb. Cloth, paper and metal vary from good to poor thermal insulators, in that order. Cells of the core may be filled with a

TABLE I

Strength Properties of Honeycomb Core

	Cell Pitch (in.)	Weight (lb./ft.^{3})	Crushing Strength (p.s.i.)	Shear* Strength (p.s.i.)
60 lb. paper (impregnated)	.440	1.70	130	40
70 lb. paper (impregnated)	.437	2.18	140	51
110 lb. paper (impregnated)	.475	2.95	240	53
.003 aluminum foil	.375	4.20	455	85
.002 aluminum foil	.250	4.30	475	90
4 oz. cotton duck (impregnated)	.440	4.70	380	90
125 lb. paper (impregnated)	.345	4.90	620	162
.004 aluminum foil	.375	5.40	660	140
.003 aluminum foil	.250	6.10	780	175
.004 aluminum foil	.250	7.85	1090	270
8 oz. cotton duck (impregnated)	.440	8.60	1000	204

*These values are for transverse core direction. Shear properties in longitudinal direction are approximately 1.6 times this figure.

TABLE II

RIGIDITY FACTORS IN BEAM CONSTRUCTION

Beam Description	Wt. Lb./Ft.^{2}	Panel Thickness (In.)	I (In.^{4})	E (x10^6)	Rigidity Factor EI (in.^{4})
.016 aluminum faced paper honeycomb	.734	1.032	.099**	8.0**	792,000
birch plywood	.734	.157	.00416	1.25	5,200
aluminum	.734	.051	.00013	10.5	1,390
steel	.734	.018	.0000058	30.0	174

**E & I are for face material only, neglecting core.
E is taken as 0.8 times face material E value to account for core shear deflections.

lightweight rigid plastic foam to increase the panel insulation properties. Typical heat transfer coefficients are shown in the following summary: (Values are approximate and are for No. 60 and No. 70 impregnated paper core faced with aluminum alloy sheets.)

TABLE III

THERMAL PROPERTIES

Panel Thickness	U (BTU/Hr./Ft.^{2}/°F) Plain	Filled
1 inch	.41	.26
2 inches	.27	.15
3 inches	.21	.10
4 inches	.17	.08

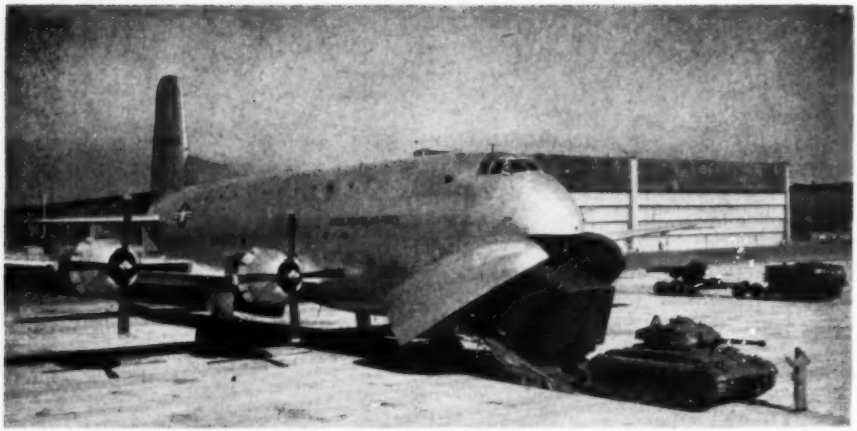
General Design Requirements of Military Lightweight Trailers

As the designer studies the requirements for some of the more advanced types of electronic units required for radar search and guidance systems used in anti-aircraft fire control and guidance of missiles and aircraft, it becomes obvious that special purpose van trailers will be required in these programs. The special requirements of the future preclude the use of a reworked "stock" van type trailer. None of those available from commercial practices would do the job and even with extensive rework would not meet certain basic requirements for performance in their part of the over all national defense effort.

One of the basic design requirements will always be that the trailers should use a minimum amount of "strategic" materials. With limited resources in steel and aluminum consideration might be given to using magnesium as the primary structural material.

Since some of these van trailers may contain radar antenna mounts and optical equipment and since the directional guidance and control of missiles may be based on the accuracy of these original readings, the van structure may have to be extremely rigid. Such rigidity is not available in a conventional type trailer and is difficult to obtain by using a conventional design configuration, especially if the internal space is to be at a maximum and to be used efficiently.

Another special requirement would concern heating and ventilating equipment and provisions necessary to hold the temperature range requirements for proper functioning of the electronic computers, etc. when operating from the heat of the tropics to the cold of the arctic. Adequate air conditioning is also necessary for the comfort of the personnel who will be operating precision equipment under exacting circumstances. The design of the necessary air conditioning equipment will generally be an extensive program in itself, and have considerable effect upon the basic structural components of the trailer. An adequate ventilating system requires a number of external air intake and exhaust doors, internal ducting, exhaust louvers and planum chambers, a heater and necessary controls for such a system. For economy in size, fuel consumption and good performance, the heating and cooling system will, of course, require a uniformly insulated structure. The allowable "U" value for the van



Courtesy Douglas Aircraft Co., Inc.

Fig. 3. Loading of military equipment for air shipment aboard Dougles C-124 Globemaster II.

trailer walls, roof, and floor will dictate that a material of good thermal insulating qualities be used.

Then, too, the electrical cables and harnesses for the electronic equipment dictate certain space and accessibility requirements. Interior lighting, also, may need to be of special design to meet both general lighting and individual considerations for specific equipment. Some equipment may require "black" lighting for optimum operational efficiency. For combat operations, blackout provisions may be necessary, with light-lock curtains and automatic door switches provided.

Another requirement for combat operation would be that the trailer roof be designed to carry a double sand bag loading for protection against shrapnel, etc. For mobility in the field, the trailer should be of such design that it be capable of traversing rough terrain without damage to the equipment within the van. This may necessitate the incorporation of a special "soft-ride" undercarriage. With many thousands of dollars worth of electronic equipment aboard, it is imperative that it be adequately protected from shock to reduce malfunctions to a minimum. Also for optimum mobility across country, the specifications might state that the trailer be capable of meeting military fording requirements. Some trailers may be required to meet flotation requirements, for beaching operations. The basic design, therefore, must reflect some very rigid sealing requirements as found in these specifications. Perhaps even more difficult for basic structural considerations would be a requirement that the van (including all doors and openings) be sealed so that no water is evident within the trailer after a prolonged driving rain. Waterproofing of the trailer van is necessary because of the effect moisture has on the operation of the electronic equipment for which these trailers are built.

The van structure and insulation will be limited; internally by space required for the equipment and personnel and, externally, by the limitations of highway travel, rail tunnel clearances, and cargo size limitations of transport airplanes. Rail transportability will add re-

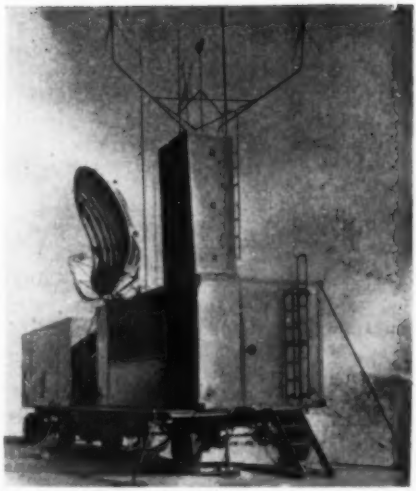
quirements of high fore and aft accelerations encountered in "hump-switching." Air transportability will also add the design requirement of lightweight.

These, then, could be some of the design requirements for the van structure of military lightweight trailers.

1. Use non-strategic materials.
2. Design for rigidity.
3. Design for air transport—lightweight—dimensional limitations—good space utilization.
4. Design for rail shipment—high concentrated loadings—dimensional limitations.
5. Design for highway shipment—dimensional limitations.
6. Design to be sealed in fording and beaching operations, and under driving rain conditions.
7. Design for rough terrain in cross country maneuvers.
8. Design for good insulation characteristics.
9. Design to provide for air conditioning equipment—openings in structure, ducting, etc.
10. Design to provide for electronic equipment—shock mounts, accessible wiring troughs, etc.

Here then appears an excellent opportunity to make use of the special advantages of honeycomb core panel construction.

A non-metallic honeycomb core faced with magnesium sheet, or with any one of several high strength non-metallic sheet materials (such as plywood, Masonite, impregnated cloth or paper), meets the "non-strategic" material requirement. Such a panel provides very efficient strength-weight and rigidity-weight ratios. Panels incorporating a non-metallic (impregnated paper or cloth) honeycomb core, have sufficiently low thermal conductivity to provide good insulation without added insulation materials. This can keep wall,

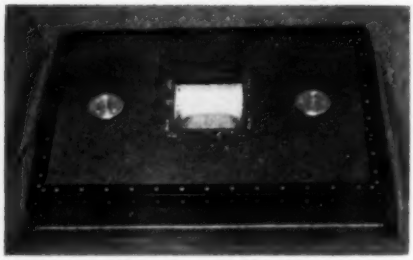


Courtesy Gilfillan Bros. Inc.

Fig. 4. Ground control approach radar trailer in operation.

roof and floor dimensions to a minimum consistent with strength and rigidity, and permit the design to meet the dimensional limitations imposed by trailer van internal space requirements and highway, rail and air transport considerations. Honeycomb core construction is a panel type construction. This would be essential to obtain the sealing required for fording, flotation and rain conditions. Previous design and manufacturing experiences indicate also a possible cost saving in the utilization of honeycomb core panel construction. In these previous experiences, competitive designs in honeycomb core panel construction and "conventional" construction were manufactured and analyzed for cost. A number of these analyses indicated substantial savings by using honeycomb core panel construction.

There are, however, certain definite limitations to this lightweight core design. One is in the handling of concentrated loadings, particularly shock loadings. If the panel, with its thin facing material and lightweight core is con-



Courtesy Douglas Aircraft Co., Inc.

Fig. 5. Test section—honeycomb core panel showing edging angles and inserts.

sidered in much the same manner as any other lightweight skin panel construction, and the concentrated loads are taken over a considerable area of the panel, and if special consideration is given to eliminating or at least minimizing the tension loads in the core to face glue line, such loads can be handled quite efficiently. Previous design experiences have revealed a number of methods of designing for these concentrated loadings, and using rugged core material to resist shock.

Application of Honeycomb Panels to Lightweight Trailers.

For this design application, the panel can incorporate high-strength facings and edge angles and honeycomb core bonded with a thermal-setting, thermal-plastic resin. (See Fig. 1). The panel sizes should be the largest possible consistent with trailer components and available materials. Standard material sizes and standard bonding equipment accommodate panels up to 4 feet by 8 feet. With larger presses available in the immediate future, it will be possible to fabricate in one panel the entire roof or side wall of a trailer. The panels should be of such design as to be readily assembled, replaced or repaired.

Care should be taken to have the honeycomb core determine the panel thickness. Nowhere in the design should there be any part such as edge banding, framing around openings, doors, or inserts, which would hold the facings away from the core. In bonded, as in riveted or bolted structure, the quality of the assembly determines the ability of component parts to do the portion of the work for which each is designed. For the integrity of the bonded panel assembly, then, nothing should be allowed to interfere with the "glue" line contact of the component parts. After bonding, the panel should be completed by the installation of additional angles and it should then be sealed to keep the core dry.

Panel to panel joints may be made with flat battens, as shown in Fig. 1, or by any one of a great variety of other joint designs. Openings in the panels should be of the same general design configuration as the edging of the panel, with effort made to keep the bonded angles on the same face as the edge angle. Doors, covering these openings, of course, must be designed to meet certain specific requirements for their appointed operation, but should be of such design that the door and the door frame may be installed after the panel is completely bonded and sealed.

Concentrated tension loads can be taken in the panel to panel joint concentrations of material or through bushings which apply a compression load to the panel itself. Through bushings should be designed as inserts to be installed after the panel bonding operation. It is then possible to properly install those which require coordination from panel to panel or to install additional inserts at any time. Service experiences or changes in equipment may require that inserts be moved or added, perhaps even in the field.

Shear loadings can be taken in the panel face to which the load is applied. Concentrated compression loads and impact loads can be taken by the face material and the core; and might be in-

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Fig. 6. Trailer used by army ordnance corp in fire control system for anti-aircraft artillery.

fluential in determining the facing thickness and core density.

Advantages of Honeycomb Construction

In the above paragraphs the general characteristics of honeycomb panels have been discussed with respect to their application to military lightweight trailers. If we now make a critical comparison of its advantages with respect to a more conventional sheet metal frame type construction, it will become apparent that it has an outstanding combination of good physical qualities which make it particularly suitable to this job. Actually there is no single performance characteristic of honeycomb panels which cannot be duplicated by some other method. When the combined characteristics are attempted, however, other methods lose what would sometimes appear to be their greater simplicity.

Rigidity

A structure can be made as rigid by other methods but the weight and amount of material needed will increase to a larger degree. Honeycomb panel structure provides the most efficient placement of strong material to give strength and rigidity in bending—right at the outer surface. Furthermore, the surface material is kept by the honeycomb from forming shear wrinkles common to other thin sheet structures, so this structure provides far less deflection in shear. Deflection tests often show these structures working its materials above ¾ their elastic modulus or E value.

Weight

The strength efficiency of honeycomb panel structure is very high in terms of material used. All the surface material can be worked in compression to stresses which closely approach their block limit values instead of only an effective width of surface material adjacent to longitudinal stiffeners in more conventional sheet structures. The result is a much lighter weight structure. However, bending strength is not the only consideration and when durability is made equivalent by a good rugged design, this weight advantage is cut down to a small margin.

Insulation Qualities

The insulation quality of honeycomb panels is built right into the structure; particularly when paper core or even cotton duck core is used. Edge closure strips on the panels conform to insulation requirements when made at least in part from phenolic or other plastic materials of low conductivity. Where a very high degree of insulation is required, and even radiant and convection heat transfer is to be held to a minimum, a lightweight foam material can be placed in the core reticules without seriously effecting the simplicity of the panels. In conventional frame construction, insulation is more of a non-uniform proposition, and is more likely to show frost spots in the interior in cold weather. Insulation between inside and outside surfaces in the region between

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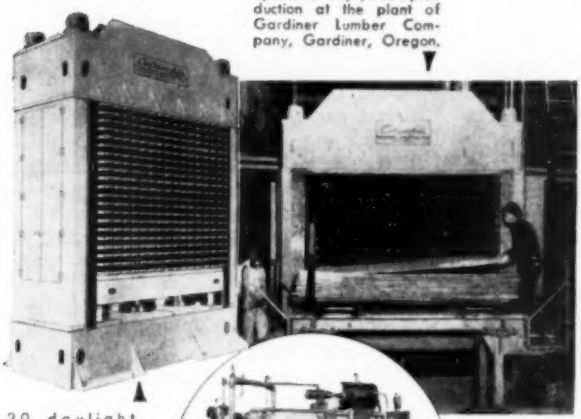

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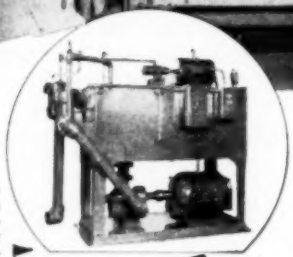

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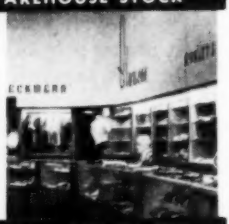

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frames of conventional structures can readily be accomplished and will perform well when new. However, after any extended service use, this insulation often tends to pack and settle. Usually it will require a time-consuming and costly installation procedure to avoid this. Right at frame stations, insulation can never be made highly effective in the conventional structure, and to overcome this a thick insulation panel (often wood) is used for the whole interior surfacing. Here, then, a severe weight penalty is generally accepted and interior smoothness, durability and neatness are usually lost also.

Space

Honeycomb panel structure can be so compacted into thin walls that more interior space is available for electronic components and personnel in military lightweight trailers. To achieve an equivalent thickness and strength using conventional structure, would require a more complicated multiplicity of framing.

Sound Deadening Quality

Conventional trailer wall structure leaves the outer surface sheets free to vibrate sufficiently in transit to amplify ground noise. The trailers using honeycomb panels are not only quiet inside in emplacement but proved quiet in transit, even while undergoing tests on the Army Ordnance Belgian Block Road at Aberdeen Proving Grounds, Maryland.

Cost of Materials

Unit cost of materials when using honeycomb panel construction can be expected to be at least equal and probably less than with conventional frame construction, assuming equivalent physical characteristics are obtained by good insulation and appearance. The fact that a lesser weight and gauge of strong sheet material is required with honeycomb panel construction is the key to

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Cost of Labor

The unit cost of the labor on military lightweight trailers using panels of honeycomb structure can be expected to be less than that of a frame type structure of equivalent characteristics, provided that the honeycomb panels are kept relatively simple and large. This remains to be proved by mass production cost figures but this probable result stems from a substantial saving possible in final assembly time.

Manufacturing Equipment Requirements

While the equipment needed to manufacture honeycomb panels is not particularly complicated or expensive, still it has only recently become available in sizes suitable to produce panels large enough to take advantage of its inherent simplicity. This has meant that conventional frame construction could be built in more industrial plants at more competitive prices where high priority items were not already in production. This lack of widespread facilities to produce large honeycomb panels at reasonable costs has been a serious handicap to immediate adoption of this construction for all military van trailers, and, until recently, has kept the cost high. Now that its advantages have been proved, however, these facilities are being expanded to do the job and will do it at a reasonable cost.

Ability to Seal

Where tropical storm, flotation and stream fording requirements call for tight sealing of structural seams, honeycomb panel construction surpasses conventional frame construction because fewer rivets, bolts and seams are required to be sealed.

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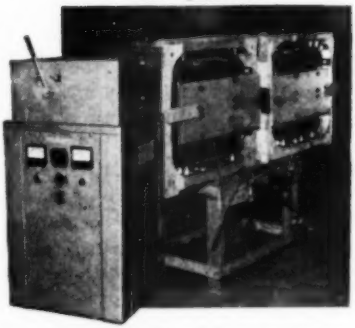

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frame construction is damaged in the field by collision or flying fragments, it is expected that the sheet and frame materials will become d e n t e d and twisted and bent. Honeycomb panel construction is probably no more resistant to such damage, but when it does occur the surface materials remain straight and supported at the edges so that a repair may be made on the flat surface by simple flat patches using sheet metal screws or blind rivets.

Interior and Exterior Neatness

Honeycomb panel construction with sheet metal surfaces, on a military lightweight van trailer body provides a smooth wrinkle free solid feel and appearance to both interior and exterior surfaces. This surface should take and hold paint without checking over long periods, not only because very uniform surface temperatures prevail, but also

since the skin does not wrinkle.

Ease of Assembly

With honeycomb panel construction each panel is an individually sealed and complete component of sub-assembly. Conventional frame construction, therefore, will usually take longer in final assembly, a time when space and production line time is more costly. Honeycomb panel construction is also particularly suitable to use in trailer design where a portion or all the structures must be knocked down for transportation in relatively smaller pieces such as is the case with the universally used GCA van trailers originally developed for the U.S. Air Force.

Production Procedures

The manufacture of panels from lightweight honeycomb core is an art which requires special techniques. The core cannot be handled in the same manner as plywood or most heavier materials. For example, even though light in weight, the core material is quite rigid and must be handled carefully to maintain its structural integrity. After fully curing the impregnated resin, it cannot be compressed to any large degree to reduce cell pitch without reducing the core properties. (Certain design applications for metallic core do allow limited possibilities for densifying the core, but with the non-metallic cores this is not desirable.) Neither can any thin walls of the honeycomb core be crushed without reducing the compressive strength of the panel. Sizing of the core for horizontal dimensional tolerances, and working with the thickness tolerances of the core and other panel components in determining the necessary tooling for manufacture of the panels, requires study and experimentation. As in the panel detail design, the tooling should be designed to allow nothing to hold the faces from the core. The importance

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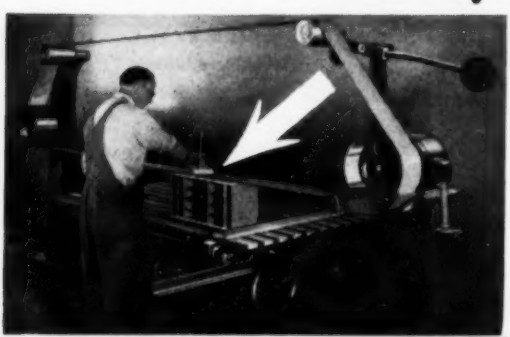

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of a perfect bond of facings to the core should be emphasized beyond all other considerations.

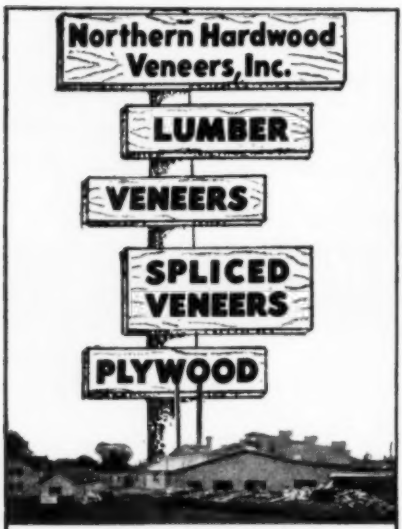
Inspection of the panels, again, should emphasize the assurance of a perfect bond. In process inspection, materials should be checked continuously with resin viscosity, core moisture content and certain strength tests of production materials made periodically. Procedures and material handling should be continuously checked. Completed panels should be proof-tested and/or sonic tested to eliminate any panels which are improperly bonded or are not bonded over 100% of the surface area. Panels may be tested by a tapping or vacuum cup method to certify that the bond has not been broken during assembly operations. Testing procedures for panel integrity by sampling or through coupons bonded in the same operation

as the production panels, while interesting, are questionable means of inspecting production panels. Proof load testing of the actual production panels seems to be the most reliable of the inspection methods. No other procedure has been better able to discover an occasional "poor" bond.

The procedure most commonly used in the bonding operation is to properly clean and etch the surfaces of the component parts, and then to spray or roller coat the adhesive on the surfaces of the core, face sheets and edge angles to be bonded. These pieces are then fitted into an assembly jig and kept under pressure during the bonding cycle. (Care must be taken in the storing and handling of parts after the glue line has been applied, to protect the surfaces from any foreign materials. Sheets of paper may be placed over the resined surfaces. Gloves should be worn when handling these parts. Proper handling procedures and material controls during the assembly and bonding operations are important if high quality panels are to be obtained.) After bonding, the panels are removed from the jig and sealed. In the design configuration shown in Fig. 1, this consists of installing closing angles and a faying surface of fillet type sealing compound. These closing angles are installed to edge-seal the entire panel and the cut-outs or openings within the panel. They may be attached with self-tapping screws or blind rivets.

Experience Being Gained

This type of trailer construction is not completely new, as trailers incorporating honeycomb core panel design have been recently developed and are being produced in increasing quantity. The fabrication of panels is continuing



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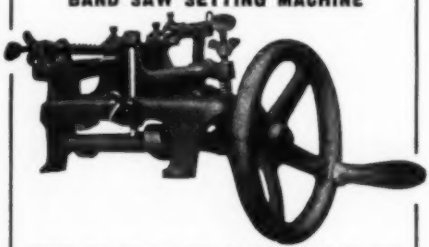

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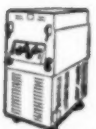

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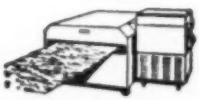
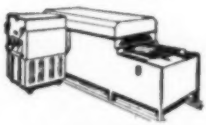


Mann-Russell Veneer Edge-Gluer



Mann-Russell Lumber Edge-Gluer

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in line with anticipated schedules. The facilities of three sources are supplying the requirements of three assembly organizations.

Other designs incorporating honeycomb core panels are also in production. Doors and interior partitions are in mass production. Various guided missile, target drone and airplane components such as fins, partitions and floors, also, are in quantity production. Arctic hut designs incorporating honeycomb core panel construction appear to be especially promising, and service experience is being accumulated rapidly.

Honeycomb core panels, moreover, are now a recognized type of construction. In air frame companies, where much of the development work was accomplished a considerable amount of test data has been accumulated. ANC documents have been written covering the

material, design and servicing of this type of construction.

Furniture Applications and Possibilities

There will be many new designs in which lightweight is important or in which other of the particular characteristics of honeycomb core panels will make their use advisable. Housing required for military operations, such as arctic huts, electronic trailers, etc., which must be designed to be readily transportable by air should certainly be of lightweight rugged construction. These qualities, together with the other characteristics discussed in preceding paragraphs, make some form of honeycomb core panel construction particularly suitable and able to meet the design specifications for such equipment. Lightweight, good insulation and tight sealing of the van bodies of commercial refrigerated trailers will save on operational cost and it is very possible that honeycomb core construction in this case may become economically advantageous and commonplace once mass production techniques are perfected and equipment becomes available to produce whole one-piece side panels in honeycomb core panel construction.

Designers in the aeronautical industry, always seeking improvements in sound, lightweight design will continue to find many applications for honeycomb panels in a variety of air frame and aircraft interior equipment components.

But it is of some concern to those of us who have been instrumental in introducing these light strong structures into military lightweight trailers and other airborne equipment, that in some of the future applications there is the possibility that honeycomb core will be misused, either in design or in fabrication. There are many special design and fabrication problems which must be considered. In extreme cases, failure to consider them may result in impractical designs or unsatisfactory products. Those in industry who are confident in the future advantages in developments of honeycomb constructions should continue their efforts for the proper use and handling of these lightweight core materials.

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STAPLE SAMPLES

The size range of staples that are cut and driven from continuous coils of low cost standard wire is shown in a new staple sample folder prepared by the Saranac Machine Company, Benton Harbor, Michigan. It is their folder SS-12-5A.

Actual staple samples are included in the folder with diagrams explaining how they are formed on the spot, driven and clinched instantaneously, all in one motion, by the Saranac stapling heads.

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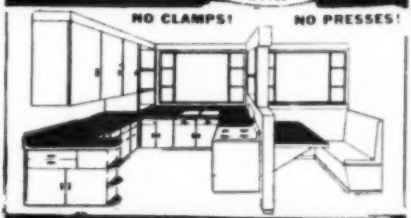

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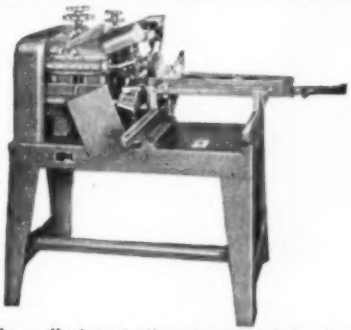

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TODAY'S... AND THE FUTURE'S... FINEST FASTENER

PREVENTING Circular Saw Accidents PART 1

By Martin H. Saltz

IN ANALYZING the accidents that occur on circular saws, in order that we might prevent them, we can divide them into three groups:

1. Saw blade contact accidents during operations.
2. Saw blade contact accidents to helpers.
3. Kick-back accidents.

The titles of the accidents in number 1 and 2 are self-explanatory, but the group "kick-back accidents" may require some explanation.

This type of accident occurs when a piece of material being worked is thrown or kicked back by the fast moving blade. It is generally believed that a kick-back occurs in rip saw operations because of the saw blade binding at the rear where the blade is moving upwards. It is necessary to maintain a steady pressure on the material being worked in order to overcome the creep back of the stock. This creep back is due to the fact that the upper half of the blade is moving toward the operator and tends to move the stock in that direction. When the saw is operating properly, it does not take much effort to overcome the tendency to creep. When the gum in green stock binds on the blade, the creep back is somewhat more pronounced but it is still controllable. The difficulty arises from the violent kick-back that occurs when the stock either drops or works it's way to the back of the blade. The teeth dig into the material and throw it backward at the operator at high velocity.

The safe guarding of circular saw operations will be discussed so that each of the three catagories mentioned earlier will be covered.

It is unfortunate that many saws, when purchased are not equipped with guards and therefore it becomes necessary to provide them after the machine is installed. The following specifications are those suggested by the National Safety Council.

"Every table saw should be provided with a spreader to prevent stock from binding on the saw and being thrown back, and to keep chips and slivers

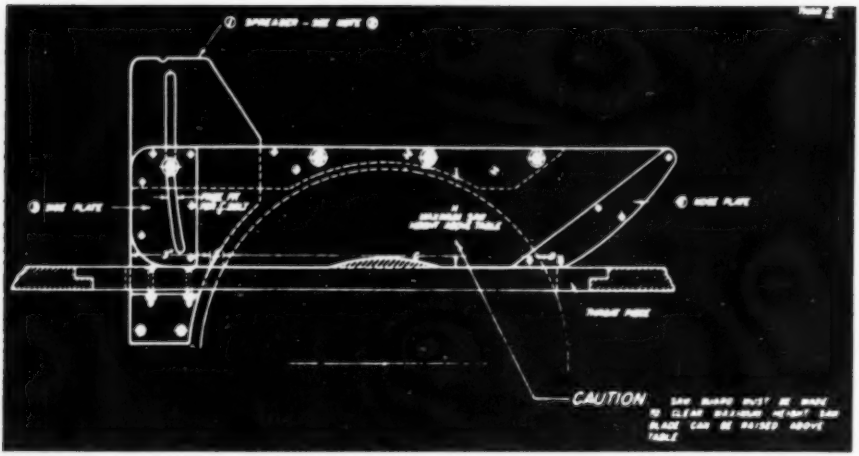

Figure 1.

away from the back of the saw where they might be caught by the saw teeth and thrown. The spreader must be thicker than the saw blade. It must be mounted rigidly, not more than ½" from the saw and should be at least 3" wide at the table level. The spreader should be high enough to penetrate the thickness of the stock." Also, when practical, every saw should have a hood over the blade.

In following through on this specification it is desirable that we have a hood, including a spreader, which completely encloses the blade when there is not any stock being passed through it. When a cut is being made it should ride over the stock and cover the portion of the blade that is passing through the wood. Unfortunately, most commercial hoods, because of their weight, are not readily acceptable. A suitable guard is shown in Figure 1. Exact dimensions are not given as they will vary for the particular machine for which the hood and spreader are designed. However, working drawings are available on request from the author. This hood is particularly practical as it is light in weight and because of its plastic construction does not hide the blade from the operator.

In some cases, it is not practical to mount the hood on the spreader. When this is the case, the hood should be suspended from the ceiling or on an extension arm attached to the base of the machine. On occasion a circular saw operation will be performed for which a hood is definitely not practical. In such cases, a "hook spreader" should be provided. The use of such a device will at least minimize binding of the stock along with the resulting kickback. Referring to the illustrations, a suitable hook spreader could be made as shown in Figure 2.

That portion of the saw blade "under the table" should also be enclosed. This enclosure might be the exhaust hood. However, if this is done, provisions must be made for the changing of saw blades.

Non-kick-back fingers (dogs) should be mounted on the hood in such a way that the points slide over the wood as it proceeds in the right direction. However, if the board should begin to lift off the table, the points will dig into the boards preventing it from kicking back.

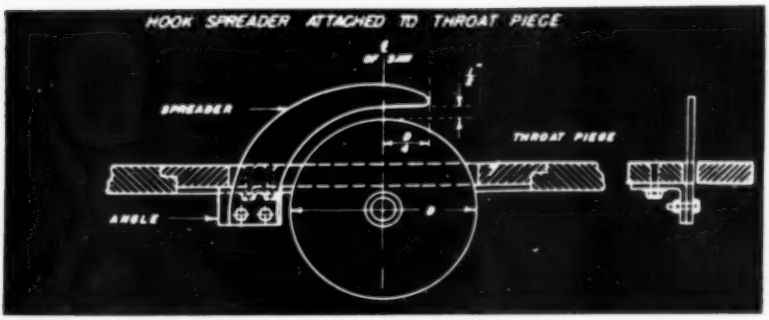

Figure 2.

On certain operations such as rabbeting and dadoing it is impossible to use a spreader, and in such a case a hood would not be used. In spite of this, these operations must be made safe. This is usually accomplished by the use of special jigs. These jigs should be made so that they slide in the transverse groove of the machine table. When the wood is locked in the jig it is not necessary for the operator to place his hand in the vicinity of the blade.

There are other precautions that must be taken when performing operations indirectly concerned with the operation of a circular saw. These might include: mounting the blade, setting the blade height and alignment of the fences, etc.

When mounting the saw blade, it is necessary to ascertain that the bearing surfaces are smooth enough, free from foreign matter, and that they are flat.

Except for rabbeting or grooving operations, the height of the saw blade should be governed by safe practice considerations. The blade should not protrude beyond three full teeth above the board.

The alignment of the rip fence should be such that the rear end should be slightly further from the saw blade than the front. A permanent mark should be made on the table top in line with, and in front of the blade. This will enable the operator to set the gauge without removing the guard.

Throat pieces should be replaced before they wear excessively. Excessive wear will allow scraps of material to become lodged between the edge of the throat piece and the blade, which will cause the latter to run out of line with possible damage resulting. This condition is more often found on saws with wooden throat pieces than those with metal ones.

In addition to providing a suitable guard, it must be ascertained that the blade is in proper condition. This can be verified by periodic inspection of the blades.

Some of the more common saw defects that should be remedied are:

1. Saw out of round.
2. Saw not straight (out of plane).
3. Improper pitch of teeth.
4. Improper or uneven set.
5. Cracked saw.
6. Dull rutting of teeth.

Unless you have the required facilities, it is recommended that the corrections of the above conditions be made by the manufacturer of the blade in order to make sure that it will be done properly.

When changing pulleys for motor speeds, it is necessary to make sure

that the speed is within the limits recommended by the manufacturer of the saw blade. If the speed is too low, heating of the blade results along with excessive power consumption and more effort in feeding.

Normal saw speeds vary from 960 r.p.m. to 9,000 r.p.m. depending on the saw diameter and tensions.

In subsequent articles we will discuss other features as they regard the safe operation of circular saws. These will include push sticks, physical conditions in the shop, scrap containers, etc.

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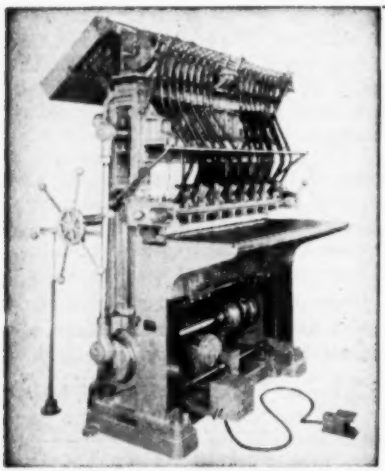

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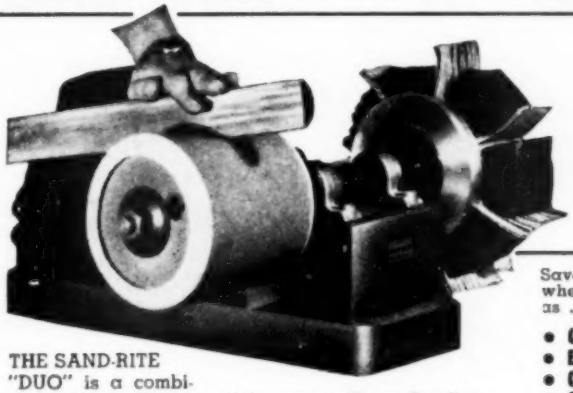

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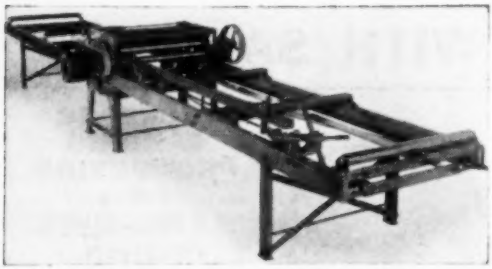

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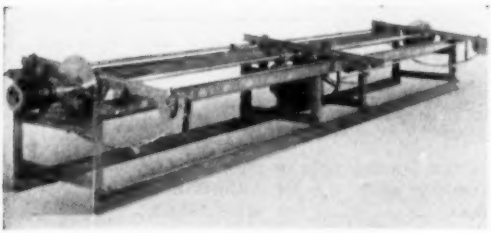

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Covering several acres, the Lane plant dominates the life, as well as the air, of this pleasant community. Its primary product, aroma-tight cedar chests for safekeeping of cherished linens, blankets, quilts, towels, are prized the world over for their handsome beauty and lifetime utility. Made in accordance with U. S. government recommendations of ¾" red cedar that comes from the forest regions of Alabama, Kentucky and Tennessee, the chests are crafted with careful workmanship in a variety of styles to harmonize with every type of furniture—beautify every room of the house.

Typical of the quality material that goes into Lane cedar chests is Urac 185 resin adhesive, manufactured by the American Cyanamid Co. The urea-formaldehyde resin, Urac 185, is used by Lane for gluing joints and bonding edge veneers because it provides excellent bonds on end grain where irregular contacting surfaces prevent a uniform glue line. Designed particularly for assembly work, this adhesive is gap-filling and craze-resistant. It sets at room temperature and low pressure and can also be used with strip heating. Lane employs both cold setting and strip heating.

In the assembly of the cases, the adhesive is brushed on pre-fitted lock miter joints, which are then assembled by an automatic jig. The use of Urac 185 makes one of the strongest possible joints and, being moisture-resistant, helps prevent warping which might diminish the cedar aroma and admit moths and dust. The chests are pressure tested to make sure they meet the company's rigid specifications.

In applying 1/28" face veneers to the edges of chest tops, Lane uses a strip

Adhesive being brushed on lock miter joints of Lane cedar chests. Pre-fitted lock miter joints are secured in place by automatic jig.

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HAND SAW

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Job Proven, the BUSER

Makes intricate, irregular or straight cuts—Accurate and Clean—Eliminates Finishing.

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Veneers, 1/28" thick, are applied to end edges of chest tops. Workman here brushes adhesive onto chip core before applying veneer. Chest top above, with veneers in place, is in strip heater to accelerate curing of adhesive.

heater to accelerate cure of the resin. Here again, Urac 185 fills the irregular gaps of the end grain wood, bonding the thin veneer permanently to the case. When a woman receives a Lane cedar chest she can be confident that it will keep her woolens fresh and safe from moths and dust, protecting them as no other storage method can.

Finished corner step-table of the Lane line of tables.

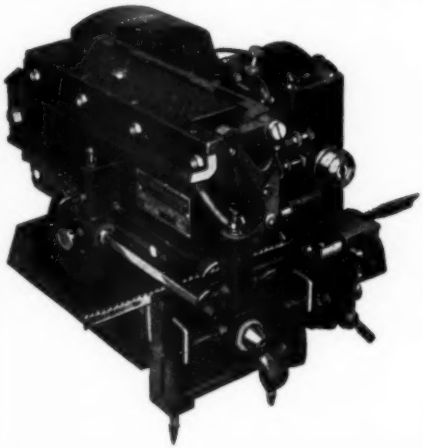
The Lane Company also manufactures a line of occasional tables with the same careful attention to wood quality and assembly skill that goes into the cedar chests. In producing the step-table shown, the veneers on the end edges of the uprights are bonded with Urac 185. Here, too, a strip heater is used.

Urac 185 is a two-component resin adhesive. Component A is a brown resin syrup consisting of a chemically modified urea-formaldehyde resin in aqueous dispersion. It will normally be satisfactory for use as long as it is readily pourable. Component B (hardener 185) is a light tan powder consisting of inorganic curing agents and a ligneous filler.

In the preparation of this adhesive, the ratio of filler-to-resin is carefully calculated. The craze resistance and low-pressure-bonding properties de-

The Lane Company employs Urac 185 for gluing of face veneers to exposed end-grain lumber core. In one operation, workman brushes adhesive onto end of four step-table upright sections. Fine wood veneers will then be applied and entire units placed in strip heater in rear for short cycle cure.

REPLACES 2 MACHINES



Files, sets, joints in one operation

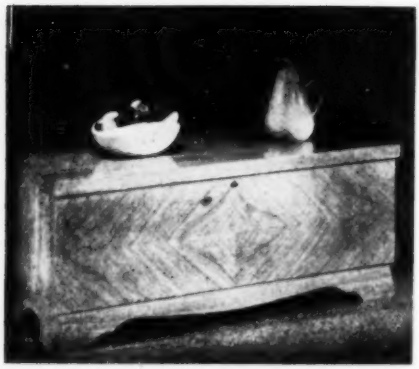
K5 Band Saw Filing Machine files, sets and joints band saws with absolute uniformity.

The result will be quickly noticed in cleaner, faster cutting and longer period of service obtainable from each blade.

K5 requires no further attention after the saw is clamped in the vise. The blade is clamped while being filed and set. Its speed is the equivalent of four men working by hand and replaces two separate machines formerly required for this work. For details write for Bulletin on K5 Band Saw Filing Machine.

THE WARDWELL MFG. CO.

3804 Ridge Rd. Cleveland 9, Ohio



Lane cedar chest is ready for a lifetime of service in protecting fine linens and blankets.

pend entirely upon this balanced formulation. Besides assembly gluing—furniture, sporting goods, millwork, joint assemblies — this adhesive is used widely for bonding decorative laminates to plywood or lumber cores for dinette, sink and counter tops, and for lumber core bonding by use of steam heated automatic core machines, high frequency core gluers and heated clamp carriers.

Better stop standing around talking, Joe. They're starting to clamp down.

PAINT SCHOOL

Increased use of spray painting is creating greater requirements for trained personnel. To help meet this need, the Binks Manufacturing Company of Chicago will conduct a new series of spray painting schools in Chicago starting early in January.

The announced dates for three one-week sessions are as follows:—

January 4 through January 8, 1954
February 1 through February 5, 1954
March 1 through March 5, 1954

Classes will be held at the Binks plant in Chicago from Monday through Friday in specially prepared quarters completely equipped for instruction purposes. Advance registration is urged.

CHECK RADIO INTERFERENCE

The problem of radio interference sometimes caused by industrial high frequency equipment is being handled at Thermatron Division, Radio Receptor Co., Inc., 251 West 19th Street, New York 11, with the aid of uniquely equipped station wagons designed for mobility and speed. The test instruments in the vehicles are capable of making precise field measurements to determine compliance with Section 18 of F. C. C. regulations. The units are easily handled by two man crews and can cover large areas in any direction around the suspected plant, checking interference in a minimum of time.

Plants equipped with high frequency installations often receive complaints from residents in the area who are plagued with radio and television interference. The new field units will quickly pinpoint the trouble to determine if the plant equipment is actually at fault. If it is not, Radio Receptor Co. is authorized to issue certification showing compliance with F. C. C. regulations. Should there be interference, Radio Receptor engineers are prepared to suggest proper shielding to remove the difficulty. Sometimes the field tests show that complaints are completely unjustified and that the interference is due to some other cause outside of the suspected plant.

The Small Business Administration

By William D. Mitchell, SBA Administrator

Congress has assigned to the new Small Business Administration a job which affects every citizen in the land and especially the rising generation. Ours is the job of assistance and cooperation with state and local governments and all segments of the population in preserving the historic American way of solving problems of small business at the state and local levels, public and private. This is the way through which the United States became strong and developed most of the good things in life.

SBA has the duty and opportunity to serve the whole field of small business concerns of all kinds. This embraces nearly 4,000,000 concerns.

Obviously, if we in SBA attempted to serve directly the needs of all small businesses, it would require an empire of employees and hugh expenditures of public funds. This would be the antithesis of the free enterprise system. The long-range problems of small business cannot be met with Government handouts, red tape, and orders and directives from Washington.

Instead, we will have an agency which will be strong and lean—composed of people who know their jobs, and streamlined to do an effective job. We will station as many of our small staff as possible in our field offices—close to the state and local governments, business and civic groups we will rely upon to help carry out the programs at the grass roots level.

It is generally recognized that the primary needs of small business firms, which make up more than 90% of all American businesses, are these three:

First, small business needs access to adequate sources of capital and credit on reasonable terms. The financial problems of small business cannot always be met by banks and other private institutions because of legal and other restrictions. This is particularly true with respect to urgently needed long term credit. Short term and intermediate term credit needs of small firms can usually be met by the banking system.

Second, small business needs greater opportunity to share in the growth of the American economy. This means that small business should have a fair share of federal government contracts, and also equitable treatment in orders by state and local governments, and large private industries.

Third, many small firms need managerial and technical consultation. Many small firms with technical problems cannot afford to employ engineers to help solve their difficulties. They find it difficult to avail themselves of expert assistance even for occasional short periods.

SBA has specific programs in each of these areas.

First, in the field of financial assistance, SBA is fostering the development of state-wide and local pools of private capital, in which banks and other financial institutions, business and civic leaders, and individual citizens can participate.

SBA is prepared to do its part with the $53,000,000 revolving fund which the Congress provided for small business and disaster loans during the present fiscal year. But this is only a drop in the bucket compared to the total needs. If the entire $55,000,000 were released in loans to small firms at once, it would

scarcely make a ripple in the national economy.

Our agency intends to use these funds prudently as a means of stimulating broader private financial assistance to small firms, through participation in loans with banks and other private lenders.

This plan is realistic. It has been tried and proved in some states and local communities. The state-sponsored credit pools in New England, for example, have attracted much attention. But the surface has barely been scratched in this field.

Second, SBA is developing plans for promoting a larger share of business, from public and private purchasers alike, for small firms. We are developing a program whereby new products and new methods of production will be opened up to small concerns for their own adoption. As an example, there are more than 19,000 inventions in which the government has an interest, that in many instances can be made available to small plants.

Third, SBA will stimulate the use of home talent and know-how to assist small firms with managerial and technical problems. For example, experts of various kinds in universities, colleges and in civic and business organizations, can be helpful to small enterprise through a cooperative endeavor.

Assistance will also be given to small firms in the areas of materials and equipment, subcontracting opportunities, certificates of competency, tax amortization, and in solving problems arising in the transition from defense to civilian production.

In short, the programs of SBA in all fields are designed to generate self-help and cooperation at the grass roots level.

CHURCHILL CABINET COMPANY CELEBRATES 50th YEAR

In August, 1904, Ole Gullicksen, then a young man of 37, decided to take a few of his fellow workers and start a new company. This became the Churchill Cabinet Company, 2119 Churchill St., Chicago. There were many trials and tribulations for the new company, but it withstood them and grew to its present size with a reputation of being one of the outstanding firms of its kind (contract woodworkers) in the nation.

Ole Gullicksen passed away in 1948 without realizing his ambition of seeing the firm's 50th anniversary. Three of his sons are now with the firm. Spencer T. Gullicksen is president and treasurer; Willard A. Gullicksen, vice-president and secretary and Rowland H. Gullicksen is assistant treasurer and director of purchases.

The Churchill Cabinet Company manufactures a complete line of telephone booths—for inside and outside use. They also make, by contract, telephone boxes, switchboard cabinets, TV and radio cabinets, electronic organ cabinets, display cabinets and juke boxes.

MEMPHIS HOO-HOO CLUB

Memphis Hoo-Hoo Club No. 92 of the International Concatenated Order of Hoo-Hoo held their annual dinner meeting August 24, 1953.

New officers elected were: President, John T. Silk, J. T. Silk Lbr. Co.; vice-president, Henry W. Jones, Bellgrade Lbr. Co.; sec.-treas., J. L. Sumrall, J. L. Sumrall Lbr. Co.

The Memphis club has built and furnished three complete woodworking shops for the Memphis Boys Town. Action was taken at the annual meeting to furnish a woodworking instructor for the shop for nine months of each year. Action was also taken to name the project "Harry B. Weiss Vocational School" in honor of Harry B. Weiss, 1st president of the club and originator of the project.

Honesty—finding everything under lock and key.

SINGLE END TENONER

The Powermatic Machine Company of McMinnville, Tennessee describes their single end tenoner in a four-page brochure. The machine is a medium heavy tenoner which offers flexibility on special runs or performs all tenon operations for the smaller shops. The machine is illustrated and complete specifications are given.

GRINDING CEMENTED CARBIDES

The Carborundum Co., Niagara Falls, New York, is offering a booklet entitled "Grinding Cemented Carbides." The 39-page booklet is amply illustrated with diagrams and photographs and reveals new techniques and abrasive products developed to obtain efficient and economical carbide tool manufacture and maintenance.

Of particular interest are the objective appraisals concerning the advantages and limitations of the use of green grit and diamond grinding wheels. Wheel recommendations covering many specific grinding applications are also included.

OILSTONE GRINDERS

The Mummert-Dixon Company, 124 Philadelphia St., Hanover, Pa., has Bulletin No. 2851 available. The four page folder describes the equipment necessary to meet the demand for rapid grinding and sharpening of woodworking tools.

The booklet describes 16 features of the grinders and their advantage to the woodworking industry. The knife grinding attachment and saw gumming attachment are also illustrated and described. The oilstone grinders offer five basic units in one: coarse oilstone wheel; fine oilstone wheel; grinding cone; leather stropping wheel and an emery wheel.

FRICK SAWMILLS

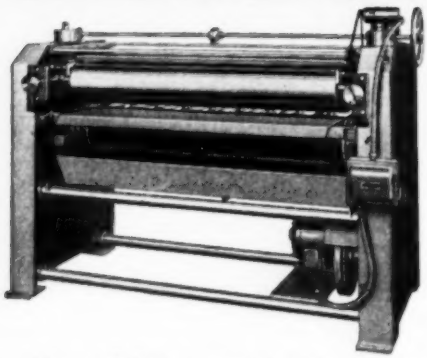
The Frick Company, Waynesboro, Pa., has a six page circular showing new features of Frick sawmills. It is catalog 87. The brochure is well illustrated and describes lumber conveyors, trimmers, edgers and lumber gauges.

WOOD STABILIZER

Nelsonite Chemical Products, Inc., 900 Monroe Avenue, N.W., Grand Rapids 2, Michigan, recently announced the availability of a new 4-page bulletin which answers the 12 questions most frequently asked about Nelsonite wood stabilizer.

It answers such questions as—What is Nelsonite? What Does Nelsonite Do? How is Nelsonite Applied? Will Nelsonite Increase Your Coats? In addition it explains in detail how Nelsonite is used for wood and wood products. Instruc-

a UNION machine...
TO MEET ANY WOOD GLUING NEED



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Write for your free copy of Union Booklet, "The How's and Why's of Wood Gluing," by Thomas D. Perry.

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300 EAST MARKET STREET
WARSAW, INDIANA

UNION SERVES OVER 2,000 SATISFIED CUSTOMERS

UNION AUTOMATIC ROLLER COATER

Unexcelled for accurate, economical operation in spreading all types of coatings. Standard models take sheet widths from 12" to 108"; thickness variance from 0" to 2". Available with hollow rolls to permit circulation of cold water through them, thereby prolonging the pot life of resinous adhesives. A reduction of 15° will double your pot life. Available with rubber-covered doctor roll at no extra cost.

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Union makes equipment for every standard production job in wood gluing. Also designs and makes machines for special applications—including machines for electronic gluing. Write for data on the complete Union line.

• • • •

USERS SAY UNION CUTS COSTS — SPEEDS PRODUCTION

tions for use are also included—preparation, application, drying time and general information.

KNIFE GRINDING MANUAL

Dependable Machine Company, Greensboro, N.C., has just announced the publication of a 67-page knife grinding manual. This grinding manual, believed to be the most complete manual of its kind ever published, is being offered free to plants using knife grinding equipment.

Some of the subjects that are covered in the manual are: erection of proper grinding room, installation of knife grinder, improving efficiency of the grinding room, composition of grinding wheels, grinding wheel speeds, dressing and truing grinding wheels, care and service of grinding wheels, suggestions on use of grinding wheels, development of knifes, grinding of knifes, knife defects and remedies, dry grinding versus wet grinding, balancing knifes, setting knifes, knife bevels, jointing, common finish defects and remedies, machine stoppages and remedies, safety, first aid, etc.

GOOD WILL FOR EMPLOYERS

Every employee, no matter where he works—in shipping, in an office, in de-

How soon is prompt?

In the shipment of Southern Wood Screws it may be five minutes!

Southern ships from stock of six hundred million wood screws in widest range of sizes and finishes — Phillips and Slotted, round, flat, and oval.

For information and free color label chart, write Box 68-D.

SOUTHERN SCREW COMPANY

STATESVILLE, N. C. MANUFACTURER OF WOOD SCREWS

Factory Warehouses:

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SOLD THROUGH LEADING WHOLESALE DISTRIBUTORS

livery, in a retail store or at a bench or a machine—is a good will ambassador for his firm, workers are advised in a booklet, "It Serves You Well," just published by the Bureau of Business Practice, New London, Conn., for distribution by employers as a communications medium.

There is a definite connection between a company's good will and the security its employees enjoy on the job, the leaflet advises, noting that most companies couldn't exist without good will every day in the year.

"Sincere interest and pride in your job will result in improved products and services," the pamphlet tells employees. "This in turn will create a greater consumer demand, which means increased security for you and your family."

"The amount of good will which you build up from day to day, both inside and outside of your company, determines how far you and your company

get ahead."

Another reminder in "It Serves You Well" is that employees help themselves by spreading the good word about their firm to their neighbors and friends throughout the community.

WOOD BORING MACHINERY

Bulletin No. 196, recently printed by the B. M. Root Co., York, Pa., carries illustrations and specifications on 15 different types of wood boring machinery.

Included are vertical multiple borers with universal type spindles, horizontal multiple machines and also single spindle borers.

Both power feed and manual feed machines are shown.

Accessories cover details of boring spindles, multiple bit cluster attachments and mortising units for square holes.

Unique attachments are motorized saws used on certain of the manufacturers machines to convert them to double end trimming saws.

Other equipment illustrated are lumber hoists, large disc sanders and frame clamps.

COIL HOLDERS

A four-page folder distributed by Acme Steel Company, 2840 Archer Ave., Chicago, describes the coil holders available for their line of wire stitching machines.

The construction and design of the 25 lb. coil holder which mounts on the machine and an adjustable floor model, designed to hold two 50 lb. coils are explained in detail. Photographs of each model, in addition to one showing a coil holder designed for dual-head stitching machines, are also included.

The bulletin also tells how users of stitching machines have increased pro-

HIGH SPEED Cutters

Made of the best grade of Tungsten High Speed Steel, properly hardened to assure effeciency and long life. Special attention has been given to relief problem, increasing ease of cutting and speeding up of production.

Write for further information

LINEBERRY
FOUNDRY & MACHINE CO.
317 Forester Ave. North Wilkesboro, N. C.

GLUE DOWEL PINS and RODS

Come to Peerless for superior quality, accurate sizing, dependable service! Pins and rods cut spiral or plain—with plain or bevel points; made of kiln dried hard maple; available in full range of sizes. **Send for prices and discounts. . . .**

WOOD KNOBS

One of our specialties! Peerless wood knobs—in a wide range of designs—are finest quality **"flat grain"** in gum, hard maple, oak, mahogany, walnut. Other Peerless products include automatic wood lathe turnings, turned drawer pulls, table leg turnings, ornaments, special turnings, toy parts, chair buttons, chair plugs, drawer stops, table pins. **Send for prices. . . .**

PEERLESS WOOD PRODUCTS CO.
2312 PRESTON ST. ROCKFORD, ILL.

duction, reduced labor costs and acquired better stitching performance through the use of these coil holders. Such items as quick installation and easy maintenance of the holders are also described.

DUST SEPARATORS

A new catalog sheet containing complete information on the use of Torit motorized cyclone dust separators in the woodworking industry has been issued by the Torit Manufacturing Company of St. Paul, Minnesota.

Included in this catalog sheet are illustrations and specifications on the two basic types of Torit motorized cyclone dust separators — FM for exhausting outdoors, and FB for indoor recirculation. There are four standard FM units, ranging from ½ h.p. to 2 h.p., and four standard FB units, also ranging from ½ h.p. to 2 h.p.

The descriptive material points out the adaptability of Torit motorized cyclone dust separators to the woodworking industry through their ease in fitting into any production set up. Compactly designed, they take up little space, may be placed close to machines to minimize installation costs, and often can be controlled by the same switches to save power.

TRUCK CASTER CATALOG

An 80-page truck caster catalog has been published by Faultless Caster Corporation, Evansville, Indiana, and is ready for immediate distribution.

The catalog is a handy guide to helping solve many material handling problems. New additions to the Faultless line are included in the catalog, such as the spring action cushion ride casters in medium and heavy duty, new drawn steel wheels (that will take static loads up to 4 tons on each wheel), floor truck locks, and numerous other casters in all duty classifications.

TUNGSTEN TEMPER

HIGH SPEED THIN KNIVES

Stalter High Quality of workmanship and material is always reflected in increased production with less "down-time."

PROMPT DELIVERY

High speed thin knives are just one of the many Stalter products for the woodworking plant. For complete details,

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STALTER EDGE TOOL COMPANY

GRAND RAPIDS MICHIGAN

HANCHETT

"Talk to the men who use them"

When you talk to men who use these two great tools, you'll find unusual enthusiasm. Most often, expert saw fitters praise these Hanchett characteristics:

1. Unusual ease of adjustment
2. Natural "feel" and balance
3. Sensitive, precise action
4. Wide range of adjustment
5. Simplicity — with rugged strength

Hanchett MATCHED EQUIPMENT for the Saw Mill and Lumber industries leads the field in outstanding quality and performance. For full details, write for Bulletin WW-83

No. 10 BAND SWAGE SHAPER

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No. 36 BAND SAW SWAGE

No. 10 Band Swage Shaper

No. 36 Long Die Band Saw Swage

COVEL SAW SHARPENERS · HANCHETT KNIFE GRINDERS

FAMOUS RED ANCHOR
GRINDING WHEELS
SEGMENTS—DRESSERS
CUTTERS—COMPOUND

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World's Largest Manufacturers of Saw Sharpening & Knife Grinding Machinery

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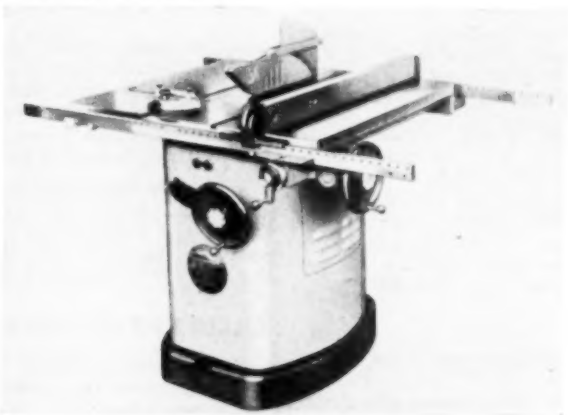
EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

TILTING ARBOR VARIETY SAW



Yates-American Machine Company, Beloit, Wis., announces production of a new 10" tilting arbor variety saw, with a rip fence—fence rail construction (patent pending) that insures perfect fence alignment at all times and represents a revolutionary principle in circular saw design.

The new saw, Model G-110, incorporates all of the essential features desired in modern circular saw construction: sturdy, shock-insulated frame; machined, heavily ribbed table; miter gauge operation on either side of saw blade (unique miter gauge rides in square table grooves yet is self supporting when extended beyond table); fence rail extensions that do not affect the accuracy of fence setting; micrometer fence adjustment (to sixty fourths) on large, easily read dial; full utilization of power (through compass Vee steel belts); maximum safety and convenience of operation.

The rip fence has "positive alignment" at all times. It locks, both front and rear, to the fence rails, and by the nature of its design, can only be locked when absolutely parallel to the saw blade. Adjustments for width of

cut are then made not by moving the fence but by moving the rails which carry the fence. The adjustment control dial engages both the front and rear rails so that a turn of the control moves both rails simultaneously, and the fence is carried through any fractional setting always in perfect alignment with the saw blade.

Lock stations on the rails are 1" apart, and are numbered according to their distance from the saw blade. Transfer of the fence from one lock station to another or to either side of the saw blade is quickly and easily accomplished. Depressing the lock lever at the front end of the fence unlocks the fence from the rails. When fence is moved to the desired station, releasing the lock lever locks the fence in place again, always parallel to the saw blade. Note that transfer of the fence from one side of the saw blade to the other is accomplished without sliding the fence off the ends of the rails.

The new G-110 has a maximum thickness cut of 3⅛". Distance from the front edge of the table to the front of the blade (when set for maximum thickness) is 13⅞". Capacity cut is 25" to the right and 19" to the left. With fence rail extensions, capacity to the right is increased to a full 48".

SAW BIT REDESIGNED

A new design, all-purpose, all-season bit for inserted tooth saws has been announced by Simonds Saw and Steel Co., Fitchburg, Mass. Developed after years of research for a saw bit that would work equally well in winter and summer, this radically new type bit represents a big advance in saw bit design.

The Simonds new "Stand-All" bit (patent applied for) is designed to break up the sawdust and deflect it away from the swage of the shank or holder. This greatly reduces shank wear, helps expel the sawdust more effectively and, most important, prevents

sawdust from slipping past the shank and spilling into the cut. As a result, friction in the cut is reduced, the saw runs freer and cooler, and saw tension remains more constant because the saw rim does not heat up.

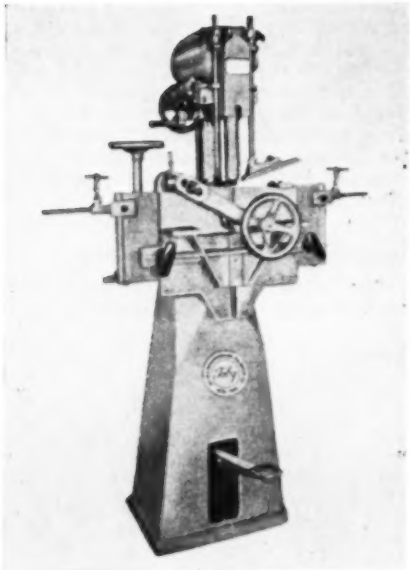
With less wear on the shanks, the saw will retain its proper tension longer and require less frequent hammering. This new type bit is designed for use with standard shanks.

CHAIN SAW MORTISER

The American Machinery & Motor Co., 22 Howard St., New York 13, N.Y., is offering a line of chain mortising machines and equipment. This machine is designed to achieve the utmost production, we are told. The vertical movement of the head is done through a foot pedal built into the front of the machine.

Positive alignment of the chain links is automatically assured by the accurate horizontal and vertical adjustments. Equipment includes: 3 sprockets for small, medium or large chain links, 1 grinding wheel, 1 key, 1 ratchet wrench.

Specifications are: length of slot without reclamping—8"; depth of slot—6"; lateral clamping service—9" x 16"; tilt



of cutter head to right and left—5°; size of motor—1½ h.p.; r.p.m.—2,800; approximate shipping weight—625 lb.

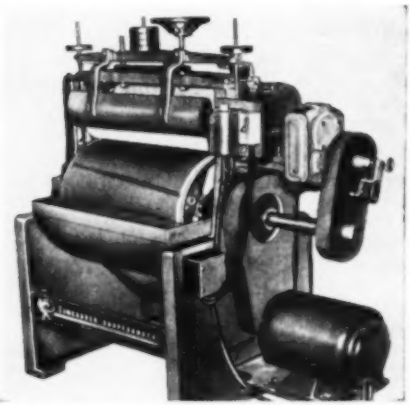
The "American" imported chain saw mortiser can be delivered immediately. Spare parts, special sizes of chain mortising equipment, etc. are carried in stock.

OSCILLATING DRUM SHAPESANDER

Timesavers, Inc., P. O. Box I, Robbinsdale, Minn., manufacturers of moulders, shapemakers and rippers, have introduced a new, larger Shapesander, Model 0-5, for sanding curved, serpentine and straight wood stock.

Considerably heavier in construction than the Model S now on the market, it features an oscillating sanding drum and a "magic touch" feed roll. The drum is built in two standard widths: 24" and 36" and in greater widths for special applications, on order. The oscillating movement of the drum duplicates a forward and slightly sideways sanding movement that provides exceptional finishes on all types of work.

Feeding of work is simplified by the "magic touch" feed roll that is easily adjustable for varied widths and thicknesses. The "magic touch" feed roll moves the work over the oscillating drum in a straight line and at a constant rate of feed; thereby benefiting



fully from the oscillating movement of the drum and assuring perfection in finishes at a minimum of time and expense.

FAST GLUE

A new quick-setting industrial adhesive that breaks up glue room bottlenecks and puts wood products on a faster production basis has been announced by Timber Engineering Company, Dept. C-10-B, 1319 Eighteenth St., N. W., Washington, D.C., research affiliate of National Lumber Manufacturers Association.

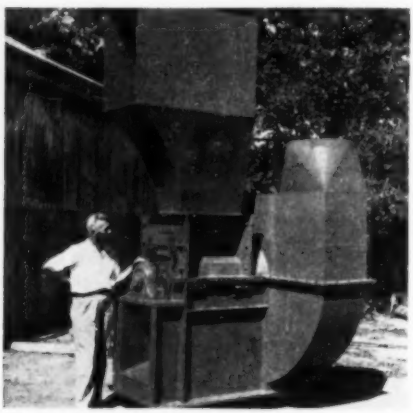
The new Teco product, developed for the furniture, woodworking and plastic-to-wood fabricating industries, is Colpres 10-B, a two-part resin adhesive that requires only 10 minutes, at room temperature, from clamping to machining. In this short period, a shear strength of 500 pounds per square inch is developed, while near-ultimate strengths of around 3,500 p.s.i. are not uncommon with dense hardwoods after 24 hours.

This quick-setting property of Colpres 10-B increases wood's adaptability to fast, assembly line production. It eliminates the long clamping periods, traditionally required to set glued-up assemblies, that tie up equipment and otherwise bottleneck output. No additional clamps are needed to speed up production with this fast-setting glue.

MONTGOMERY BLO-HOG

This Blo-Hog, shown with its inventor, W. T. S. Montgomery, is manufactured by the Jacksonville Blow Pipe Co., Jacksonville, Fla.

A trip through a southern veneer mill started Montgomery thinking about the problem of waste wood and bark. The Blo-Hog is the result of five years' of concentrated effort to do something about such waste wood. The hog eats up everything, we are told—pine, oak, gum, hickory, elm, wet veneer, round up and sandy bark, cores, timbers and slabs. It will even eat up wire, nails, screws, steel plate ⅛" thick, without any damage to the machine, we are told.

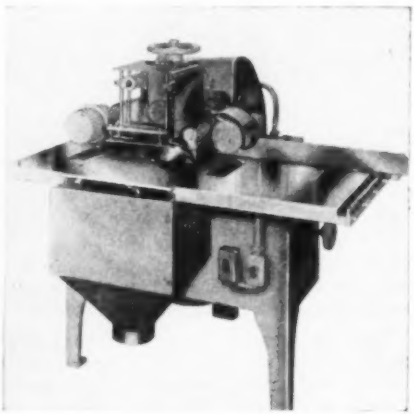


It has opened up a new field for a great many woodworking plants to convert their nuisance scrap into profitable items and one of its economical advantages is that when fed by conveyor, it does not require an attendant. Cutting surfaces of the teeth and anvils are coated with tungsten carbide.

Montgomery Blo-Hogs are now in operation throughout the country and Canada and Mexico, grinding up wood for fuel, or as chicken litter, cattle bedding, chips for the manufacture of wall board, finely ground particles for further reduction to wood flour, filler for the felt industry and molded products, sweeping compounds and many other products.

SMITHWAY OFFERS RIPPER

New models of the XL ripper have been announced by the Smithway Ma-



chine Company, 4617 Airport Way, Seattle, Washington. The company claims that the new models are the best yet, incorporating improvements suggested through interviews with the men actually operating the machines. Three models, model 104 (10 h.p.) model 108 (10 h.p.), and model 208 (20 h.p.) give the buyer a choice of the exact machine for his individual needs.

Design changes include a quick acting saw fence which is mounted on roller bearings for rapid adjustment, and with a positive one twist locking device. The saw motor and arbor comprise an integral unit. This unit has been redesigned for easier maintenance and overhaul. The manufacturer has also standardized many parts for greater interchangeability between the

three models. This standardization, the manufacturer claims, cuts manufacturing cost and the savings are passed on to the customer.

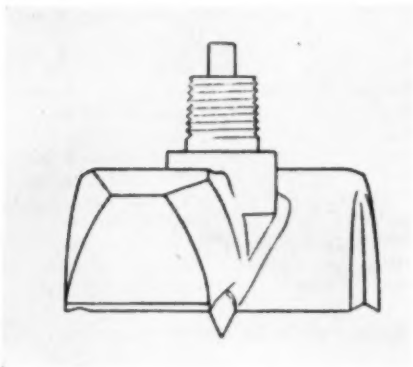
All models are adaptable to single blade or gang ripping. Stock as short as 4" in length can be fed through the machine, which has a thickness capacity of 4". Feed speeds can be adjusted from 50 to 190 feet per minute.

PLANETOR BITS

A complete new series of flush spur Planetor "chip flow" machine bits, especially suited for stack boring in wood and related materials, has been developed by Price & Rutzebeck, 22150 Meekland Ave., Hayward, Calif., tool distributor specialists.

Three types of bits now are offered in the line—the standard, lead point and new flush spur. All are immediately available in a choice of 49 sizes, from 1" to 4½" by 1/16ths, and in larger sizes on special order.

Flush spur bits eliminate the hampering washer customarily encountered in stack boring. Another principal advantage is boring of completely flat-bottom holes, by retracting the adjustable pilot.



Additional features of the new Planetors, the manufacturer reports, include ability to enter a cut on an angle, bore on close centers, and perform some routing operations. All bits can be sharpened with a file, and are removable from shanks of varying lengths.

Flush spur bits are not recommended by Price & Rutzebeck for boring plywood stacks. Lead point models are approved for this material, as their cutting edges approach glue lines on an angle and cut through them gradually.

DEWALT INTRODUCES SABER SAW

A saber saw developed as an attachment to its radial-arm Power Shop was

introduced for the first time by DeWalt Inc., Lancaster, Pa. subsidiary of American Machine & Foundry Company, at the National Hardware Show held in New York early in October.

Radically different from the conventionally designed jig and saber saws now on the woodworking market, it is mounted directly on the motor assembly of the DeWalt Power Shop. A Scotch yoke mechanism converts the rotating motion of the Power Shop's motor shaft into reciprocating motion of the saber saw's blade.

One of the features of the DeWalt saber saw is its ability to perform bevel scroll cutting without table-tilting adjustments. The entire tool can be tilted to any angle of bevel up to 45 degrees, left or right, by adjusting a wing nut.

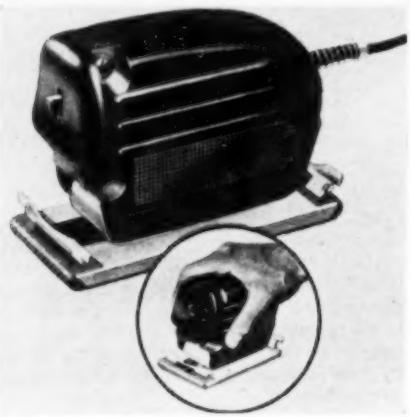
The saber saw unit is housed in a

casting less than 9" by 6" in size. Despite the compact construction, it is capable of cutting both interior and exterior curves on stock up to 2" thick. Maximum throat capacity, from blade to column, is more than 27".

The development of the saber saw follows on the heels of a new model of the DeWalt Power Shop, redesigned so that it can handle large sheets of plywood or composition board. The DeWalt Power Shop, a multi-purpose power tool, can now rip to the center of any length panel up to a width of 48", we are told. Basically a radial arm saw, the DeWalt Power Shop is quickly converted into a dado machine, shaper, router, disc, drum or belt sander, boring machine, lathe, surfacing machine or saber saw.

SANDER-POLISHER

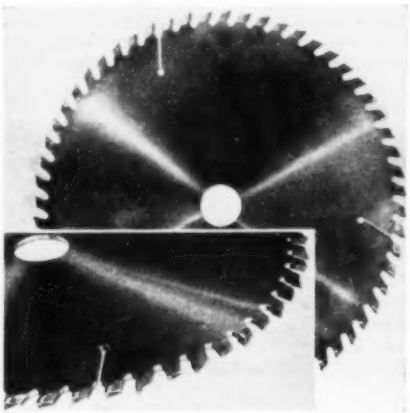
A small electric sander-polisher power tool is being offered by the S. F. Carter Co., 114½ W. Washington St., Dept. WD, Gainesville, Georgia. The tool is lightweight and operates on 110-120 v., 25 w., 60 cycle, AC only.



The sander has straight line action which permits sanding with the grain and will sand all the way into corners. It is shaped to fit the hand easily and has many uses for light sanding. The sander is particularly adapted for feather edging and blending into painted surfaces for repainting jobs, we are told.

CARBIDE-TIPPED SAW FOR LAMINATES

A new double bevel (D/B) carbide-tipped saw especially designed for the cutting of laminates and double faced veneers has just been announced by Lemmon & Snoap, 290 Bridge, N.W., Grand Rapids, Michigan. This new saw is called the D/B model and is now available for delivery.



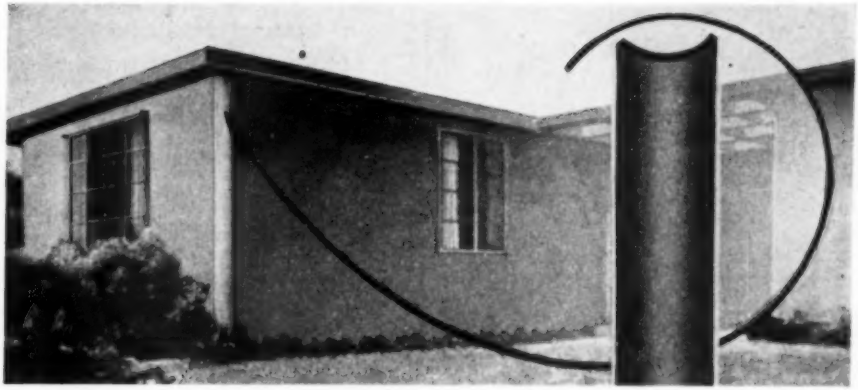
Field tests conducted over the past two years indicate that double faced panels of Micarta, Consoweld, Formica and other similar laminates as well as top and bottom faced veneered stock can now be cut smoothly without tearing or chipping of either surface.

Design of this new product incorporates both alternate back and top bevel and the D/B Saw is available in a variety of diameters and tooth specifications.

NEW USE FOR MOLDED PLYWOOD

Among the innovations in the new Unishelter Homes, is a corner angle, made by Keller Products Inc., of Manchester, N. H.

This angle is made of cross banded molded plywood, molded and bonded



under heat and high pressure with waterproof, weather resistant synthetic resin glue.

These angles, though only ½" thick, are used for their great structural strength and for their streamline appearance.

A similar angle, one inch thick, also made by Keller Products, was used by the Pressed Steel Car Co., Inc., in the manufacture of its Unicel Freight Cars.

These molded plywood angles have proved to be extremely strong, light in weight and practical in every way.

PORTABLE HEATER

A redesigned standard model Herman Nelson portable air heater has been announced recently by the American Air Filter Co., Moline, Illinois.

The heater is powered with a new Briggs and Stratton Model 6 engine. The use of this streamlined, more powerful engine has permitted modification in engine mounting resulting in

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___Routers
___Safety Clothing
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___Sanders, belt
___Sanders, contour
___Sanders, disc
___Sanders, drum
___Sanders, endless bed
___Sanders, portable electric
___Sanders, special
___Sanders, variety
___Sandpaper
___Saws, arbor
___Saws, band
___Saws, chain
___Saws, cross-cut
___Saws, cut-off
___Saws, gang
___Saws, portable electric
___Saws, radial
___Saws, rip
___Saw blades, band
___Saw blades, carbide
___Saw blades, circular
___Saw Guides
___Screws
___Shapers
___Shaper Collars
___Spray Equipment
___Stackers, lumber
___Surfacers
___Tackers
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a much simpler, cleaner arrangement of components at the air intake end of the heater.

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The standard model is the only self-contained gasoline fired unit in the Herman Nelson Line. It is ideally suited where electricity is not available and where easy portable and spot heating in the ducts are important factors.

BARREL SANDING

Five coated abrasive belts on the automatic barrel sander in the photograph permit this machine to finish the outside surfaces of approximately 300 to 350 wood barrels per hour, or about 3,000 barrels in one eight hour day. The aluminum oxide sanding belts, manufactured by Behr-Manning Corporation of Troy, N.Y., require replacement once each week of 5 eight hour work days—approximately once for every 15,000 barrels sanded. Only one operator, who loads and unloads the sander, is required.

The belts consist of 36 grit aluminum oxide abrasive grain with an X-weight cloth backing. Three belts, on the left side of the sander, measure 10 in. wide and 22 ft. long. These belts sand the top, center and bottom sections of the barrels. The two belts on the right side of the machine measure 8 in. wide and 26 ft. 3 in. long. These belts sand the narrow sections not sanded on the barrels by the first three belts.

The barrels are sanded on a three station indexing table. At station number 1 the finished barrels are removed from the machine and the unsanded barrels are loaded onto the machine. The table then rotates clockwise and moves the unfinished barrels to station number 2 where the three 10 in. belts sand top, center and bottom sections. The table moves the sanded barrel to station number 3 where the two 8 in. belts finish the barrel. From there the barrel is returned to station number 1 for removal. The barrels rotate during the sanding operations.

Coated abrasive belts on this automatic barrel sanding machine permit fast barrel finishing and requires only one operator. Three belts on the left side of the machine sand top, center and bottom sections on the belt. Two belts on the right section of the machine sand the narrow bands left unsanded on the barrel.

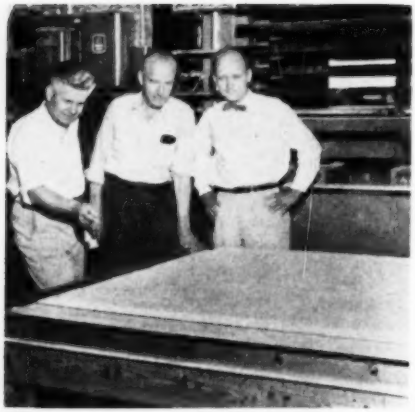
WOOD WASTE PLYWOOD

A new type of plywood made basically of wood waste is now in the final stages of development at the Wilco Research Laboratory, recently established by Wilco Machine Works, Inc., 1301 North Hollywood, Memphis 3, Tenn.

Elmendorf Research, Inc., of Chicago, developer of the new panel called "Nu-Plywood" is conducting the present tests in Memphis, which are being carried out to perfect the process and develop the machinery for manufacturing.

Lloyd Johnson of Duluth, Minn., a timberman who is backing the project said that after more than three years of experimental work it is "now ready for large-scale pilot plant manufacture."

Armin Elmendorf, president of the research organization, listed a few uses



Here is a panel of Nu-Plywood which has a wood waste core and veneered exterior. Looking on are (left to right) Lloyd Johnson of Duluth, Minn., a timberman who is backing the project; Armin Elmendorf of Chicago, head of a research organization which is developing the product, and Daniel N. Copp of Wilco Machine Works, Memphis, whose research facilities are being used for the tests.

of the new synthetic board as furniture, wallboard and trailer linings. Mr. Elmendorf pointed out that the new board will cost very little to manufacture.

"The new process is a conservation measure, which will help to save the timber resources of the country suitable for conversion into veneer," said Mr. Elmendorf.

Further conservation will be accomplished through using up wood waste which is now burned. Mr. Elmendorf explained that the core of the new panel is made of sawmill waste such as sawdust, shavings, edgings and trimmings.

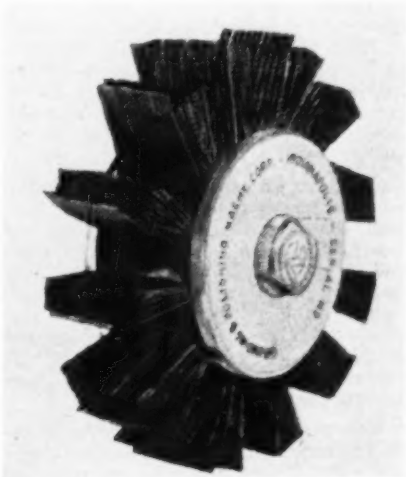
The Wilco Research Laboratory has been set up to meet the need for full-scale experimental work in the laminating, hardboard and chipboard fields. It is made available to any firm wishing to conduct tests by Wilco Machine Works, an organization of specialists in woodworking machinery headed by Richard O. Wilson and Daniel N. Copp.

As basic equipment for the lab, Wilco has installed a five-opening 100 by 66-inch Siempelkamp hydraulic hot plate press, imported from Germany. Other facilities include glue spreaders, mixers, chip pulverizers and testing instruments. In order to have a ready supply of wood particles available, the laboratory is located at Hartwell Brothers, handle manufacturing firm.

POLISHING HEAD FOR CONTOURS

A new "bantam weight" Vonnegut portable polishing head for contour finishing of wood, plastic, metal or ceramic workpieces has been added to the line of Vonnegut, Marschke and "G & P" products of Grinding & Polishing Machinery Corporation, 2530 Winthrop Ave., Indianapolis.

The new head weighs just 2 lb. Featuring 12 brushes and 12 relatively narrow strips of abrasive—each only 1½" wide—and a diameter of only 6½" —the head requires less power than the



larger 16 and 32 brush Vonnegut heads, permitting the use of smaller power tools. A variety of adaptors are made for applying the head to almost any type of small power tool up to 3,500 r.p.m.

In addition to its advantages of light-

weight and use on lighter portable tools, the small diameter of this 12 brush head lets it get into concave areas of smaller radii than can be reached with the larger Vonnegut heads. Action of the Vonnegut polishing head, according to the company, is such that it forces the abrasive into contours and depressions of the work piece without cutting down the higher areas of the pattern.

SOLID BOARD FROM WASTE

The Chipcraft Company of Morristown, Tenn., is manufacturing a new machine to produce solid board from wood chips. The new material, called chipboard, is resistant to warping and swelling and has dimensional stability. We are told that it is on a par with wood for purposes of drilling, sawing, sanding, planing and joining.

John Crafton, president of the firm, says that two machines for producing the boards are already at work—one in a pilot plant at Morristown and one in the Berkline Corp. of Morristown. The company is now manufacturing one machine a month, but expects by 1954 to be able to build 25 to 40 machines a year.

The basic principle of the machine is the extrusion of board by means of forcing the wood chips and synthetic resins through a given area under moderate pressure. The machine is continuous, fully automatic and can produce board of any thickness, density, length or width. The board, treated with special adhesive resins developed by Reichhold Chemicals, Inc., is resist-

Delivery end of the Chipcraft machine. This machine extrudes ½" x 4' board continuously at the rate of 2' a minute.

MAX. 16" & 20" DISC SANDERS

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Unsurpassed for surfacing wood, metal, plastic, etc.

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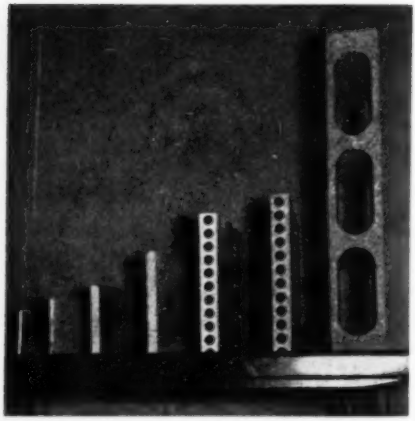
The HARTFORD CLAMP COMPANY EAST HARTFORD, CONN. Est. 1915



Samples of boards which have been produced by the Chipcraft extruders. The large fluted board is adaptable as a complete wall panel. The smaller fluted panels are used as door cores or centers.

ant to water and has the properties of fire resistance, too, if special resins are incorporated. Its principal uses to date have been in furniture, chair and door making.

Crafton says that units operated by two men can produce up to 36,000 feet of board a day.

SPRAY BOOTH CLEANER

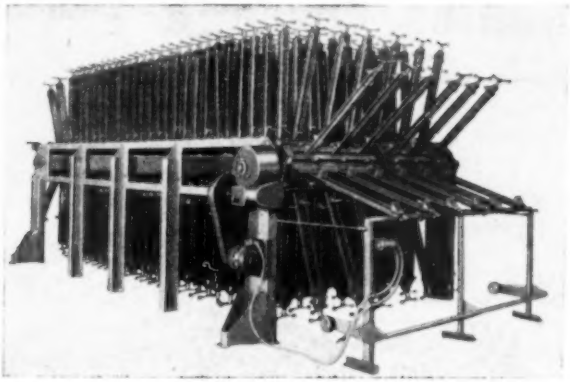
A product for greater efficiency and reduced costs in cleaning paint spray booths has been announced by Thompson & Co., Oakmont, Pa. Designated as "Spray Booth Shield," the substance protects the inner surfaces of spray booths as well as turntables and stands so that when paint overspray accumulates it may be removed easily and quickly. The cleaner is of a paste-like consistency and is a milky-white in color. It can be applied to any surface by brush, trowel or knife to a thickness of about 1/16-inch. Since it always retains its original consistency it may be used, after application, in either of two ways. First, it may be covered by any common type of paper. In this method, when paint overspray builds up the paper can simply be stripped off by hand or with a scraper, and new paper added. Or, if desired, the shielding material can be used alone, so that overspray strikes it directly. Then, after paint accumulates, both paint and the shielding can be removed easily with a scraper or putty knife.

SANDER-POLISHER ATTACHMENT

Du-Fast, Inc., 32 E. 4th St., New York 3, N.Y., manufacturers of a line of sander and polisher attachments bearing their name, announce a new hi-speed "Universal Model" that fits any make ¼" electric drill. This new sander and polisher attachment has a host of brand new features.

Operating at double the r.p.m. speed of the drill used, it produces faster, more efficient work. It also employs orbital motion, long accepted as the most satisfactory motion for perfect finishing — eliminating burrs, burns, swirls, mars, kick and buck. The Du-Fast sands and finishes all woods, metals, plastics, plaster and other materials, as well as performs all rubbing, waxing and polishing operations—getting into "tight" corners and places, and functioning with equal success on flat, round or curved surfaces. Du-Fast has a working surface of 3 2/3" x 7", and uses a standard size 3 2/3" x 9" sandpaper.

WHAT IS GOOD IN GLUING MACHINERY?



One of the oldest manufacturers of woodworking machinery, whose operations date back to 1882. The Black Brothers Company, Inc., Mendota, Ill., are responsible for many innovations and improvements in the equipment and machinery used in modern gluing practices.

Always pioneers, Black Brothers were ever alert to supply the tools needed in the rapidly growing woodworking industry. 'Way back in 1903 a demand developed for a machine to speed up edge gluing production requirements. Black's originated the draw screw clamp both the single and double draw bar types, on which they secured U.S. Patent No. 723,160 on June 30th, 1903. The first clamp carrier with the new draw screw clamps was built by them in that year and was shipped to their customer in Pittsburgh, Pa. The introduction of this clamp made the wide application of the clamp carrier possible and through the past 50 years, with improvements and refinements, this type of machine has never been surpassed in the performance of the functions for which it was pioneered.

The clamp carrier is coming more and more to be recognized as a tool of great facility and a very definite factor in the economical completion of large production programs. It is by no means fading from the picture, on the contrary a careful scrutiny of the orders shipped by Black's reveals that their clamp carrier sales in 1952 were in excess of any previous year and that deliveries for the first six months of 1953 are running ahead of the same period for 1952. In-so-far as Black Brothers clamp carriers are concerned, this is indeed a firm indication of their popularity and usefulness to a large segment of the woodworking industry.

The type of clamp carrier which is the most popular among manufacturers with extensive production is the endless chain or caterpillar type, of which there are two models; the 60° close coupled machine and the 90° extended machine. "Degree" refers to the angular opening between the sections at the loading point.

The 60° carrier, as shown in the illustration, is usually used with 2½" and 4" high jaw clamps. The 90° machine with 7" capacity clamps or machines in special combinations.

Here is a 60 section, 60° close coupled clamp, 7' 6" wide with clamp jaws 2½" high. This carrier is ordinarily made with an even number of sections from 16 to 60, and in widths up to 22' 6". It can be supplied with a greater or lesser number of sections, according to requirements.

Mechanics Through The Ages

WHEN THE FIRM OF **BOULTON and WATT** ENGLISH BUILDERS OF THE WORLD'S FIRST SUCCESSFUL STEAM ENGINES, ERECTED A NEW FOUNDRY, BOULTON STAGED A **RIOTOUS** FEAST AND CHRISTENED THE PLANT WITH **WINE** IN THE NAME OF VULCAN AND THE DEITIES OF FIRE AND WATER!

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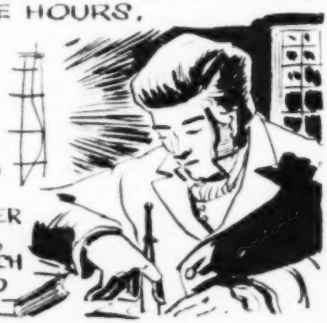
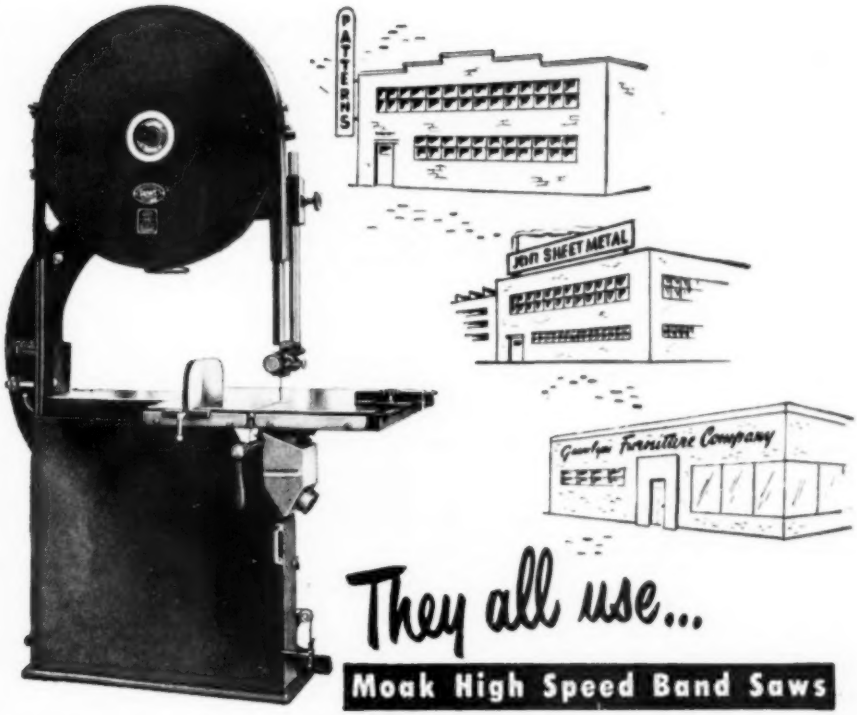
TO ESTABLISH A UNIFORM SYSTEM OF **SCREW THREADS**, JOSEPH WHITWORTH, FAMED BRITISH MACHINIST OF THE MID **1800's** COLLECTED A COMPREHENSIVE ASSORTMENT OF VARYING SCREW BOLTS FROM A NUMBER OF DIFFERENT BRITISH WORKSHOPS, FIGURED OUT AN AVERAGE THREAD-PITCH FOR VARIOUS DIAMETERS.... AND ADOPTED A MEAN ANGLE OF **55** DEGREES!





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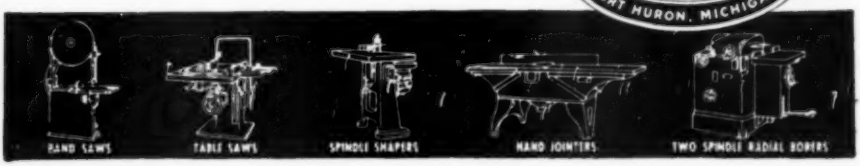

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Jointers, Glue, Yates-American No. 213 bb. dmd.
Jointer, New Moak 12", bb. dmd.
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Sander, Smith 49" 3-drum endless bed, bd.
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Multiplex No. B-60 radial arm, 7½ HP motor

RIP SAWS
American self-feed with motor
Greenlee No. 426 Roll Feed with motor

TENONERS
Greenlee No. 534, tilting spindle D.M.D.
American single-end with copes, rolling table

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Northfield 36", Motor Driven

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Root "GM" Vertical Single Spindle
Root D210 Hyd. Horizontal Single, H.D.
Greenlee No. 369 3 Ft. Vertical Multiple Spindle

CARVERS
Porter Ball Bearing, Single Spindle
Gallmeyer & Livingston Single Spindle
Minnesota No. 308E 16-Spindle Multiple

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Taylor 7½' 40 Section Chain Type

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Handy No. 444 Two-Way Air Clamp

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Francis No. 280, 48" Edge Plate Gluer
Black 5-Gallon Portable Resin Mixer

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Diehl No. 60 Continuous Feed Glue Jointer
Yates No. 213 Continuous Feed Glue Jointer

LATHES
Imperial Automatic Turning, D.M.D.
Mattison No. 55C Ball Bearing Auto. Turning

MORTISERS
Wysong & Miles No. 284 P.F. Hollow Chisel
Fay & Egan No. 462 P. F. Hollow Chisel
American No. 20 P.F. Hollow Chisel

PLANERS
Colladay & Power 24" Single, M.D.
Whitney and Buss 30" Single, M.D.
Whitney 30" Double, 8 Feed Rolls

SANDERS
Smith No. 401, 42" 3-Drum Endless Bed
Fay & Egan 48" 3-Drum Endless Bed
Sheboygan 49", 3-Drum B.B. Endless Bed
Mattison No. 137 D.M.D. Hand Block Belt
Curtis No. 11 Semi-Automatic Belt Sander
Loeffler 16x24" B.B. Sanding Drum
Wysong & Miles No. 173 Universal Belt

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Porter Floor Type, with Table
Y-A No. C-44 Floor Type, with Table
Root & American Double Cut-Off

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Hermance No. 333 Chain Feed Rip
Yates G-2 B.B. Chain Feed Rip

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Porter No. 200 SVM Single, M.D.
Whitney No. 165 D.M.D., Single
Porter No. 155 Serpentine Shaper
Onsrud W-123 Automatic with Frequency Set

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Colladay-Power-Fay & Egan Single End

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Yates-American U90 H. S. Electric Router
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Buss No. 4A—30" Direct Motor Driven Ball Bearing Single Cabinet Planer; sectional rolls, electric knife grinder
Belsaw Motor Driven Ball Bearing Gang Ripsaw
Tannewitz 42" D.M.D., B.B. Band Saw
Yates-American Y36—36" Motor Driven Ball Bearing Band Saw
Porter C43 Motor Driven Straight Line Cut Off Saw
New Britain No. 2 Chain Saw Mortiser, vee belt motor driven
Greenlee No. 356 Direct Motor Driven Vert. Single Spindle Borer
Yates-American S-23 49" Direct Motor Driven B.B. 3-Drum Roll Feed Sander
Greenlee No. 165 Motor Driven High Speed Single Spindle Shaper
Whitney No. 134 Motor Driven Ball Bearing Double Spindle Shaper
Whitney No. 295 Direct Motor Driven Double Spindle Automatic Shaper
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BAXTER WHITNEY 2 Spindle 5 HP, 3 phase, 60 cycle Motors
BAXTER WHITNEY 2 Spindle No. 134, w/freq.
OLIVER Single Spindle BB, 7½ HP

MATTISON No. 202, 20 HP Straight Line Rip Saw

BORING MACHINES

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GREENLEE No. 228 Hollow Chisel Mortiser, 1½" cap., 5 HP, DMD

JOINTERS

TOWNSLEY 16", BB, DMD
L. P. POWER 12" Round Head, 5 HP, DMD, BB
DIEHL No. 69 Veneer

WYSONG & MILES No. 284 Mortiser, BD, DMD, 5 HP

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YATES G-2, 15 HP

DEWALT Radial, 10 HP

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OLIVER 173E Jig
AMERICAN B-36", Band Scroll

ROUTERS

ONSRUD W-240-D, 5 HP
REDIN 2 HP

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MISCELLANEOUS

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Yates-American No. 213 Glue Jointer, B.B.

LATHES
Mattison No. 55C & 57D, Double End Drive

MORTISERS
Sidney No. 702 Hollow Chisel, B.B. D.M.D.
New Britain No. 2 Chain, M.D.

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Mattison No. 262, 6"x4", all electric
Yates-American C-88, 6"x4", all electric

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Crescent P-24, 24" single, B.B., D.M.D.
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Whitney No. 32-30" Single Cabinet, B.B. D.M.D.
Whitney 29-36" Single Cabinet B.B. D.M.D.

ROUTERS
Onsrud No. W265 & Ecco No. 327

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Mattison No. 124-6' Auto. Stroke, M.D.

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Smith 42"-3 Drum End. Bed, B.B. D.M.D.
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Onsrud No. W226 Buck Shaper, B.B. D.M.D.

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12" Colloday L. Powers, H. B. Smith, Crescent, Sidney
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Northfield 12" DMD
Yates-American 16" D.M.D.

LATHES

Mattison 55C BB Live Tailstock

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New Britain No. 2 and 7
Northfield chisel mortiser, motor driven
Wallace chisel mortiser, motor driven

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Mattison No. 262 6" Drop Bed, BB, all elec.
Yates C4A 8 x 4 B.D.
Yates C55 9" DMD All Electric
Yates-American, 18" DMD C55, BB

PLANERS

Northfield 24" single, MD motor fd. No. 5
Whitney No. 32 36" BB CMD Knife Grinder
Whitney No. 32, 30" BB, Belt Drive
Whitney No. 29 40" CMD, BB
Whitney No. 24, 30" Double—CMD

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TENONERS

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Yates-American No. 213 Direct Motor Driven Glue Jointer
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Mattison 30" No. 55-C motor drive ball bearing

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Yates A-1 Planer & Matcher
Yates-American A-66 Planer & Matcher

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Wysong & Miles No. 286 Hinge Seat Mortiser
Wysong & Miles 6-Spindle No. 268 Mortiser

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Mattison 12" No. 226 Electric Moulder
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Yates-American 30" No. 177 ball bearing, direct motor driven with electric grinder
Whitney 30" and 36" No. 24 direct motor driven ball bearing, with grinder and jointer

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Mattison No. 124 Automatic Stroke Sander
Mattison 6 Ft. hand stroke sander
Wysong & Miles 8" No. 294 Automatic Stroke Sander, Direct Motor Driven, Ball Bearing
Wysong & Miles No. 275
Wysong & Miles No. 171 DMD BB belt sander
Pearson Waterfall Sander
Oakley Model H drawer Sander
Oakley Model E-1 Double Belt Sander
Nash No. 50 and No. 25 Turning Sander

BAND SAWS

36" Yates-American Motor Driven Ball Bearing Band Saw
Yates-American Type V-54 Roller Bearing band resaw
Berlin 44" No. 283 band resaw

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Fay & Egan No. 301A Direct Motor Driven Ball Bearing Swing Saw
Eaglesfield Direct Motor Driven Ball Bearing Swing Saw
Wilkin-Challoner Chain Feed Double Cut-Off Saw and Panel Sizer

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American No. 15 Ball Bearing Chain Feed Rip Saw
Yates-American G-67 Chain Feed Rip Saw

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Porter No. 600 high speed electric router
Yates-American U-9 Electric Router

SHAPERS

Whitney No. 251 Double Spindle Electric Shaper
Whitney No. 234 Double Spindle Electric Shaper
Whitney No. 295 Double Spindle Automatic Shaper
Onsrud W-125 Double Spindle Automatic Shaper
Onsrud W125 Single Spindle Automatic Shaper

TENONERS

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Dennis Veneer Taping Machine, Motor Driven
Merritt Veneer Drier
Francis 84x36" hydraulic veneer press, M.D., with booster pump and overhead crane
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Merritt 55" Veneer Clipper

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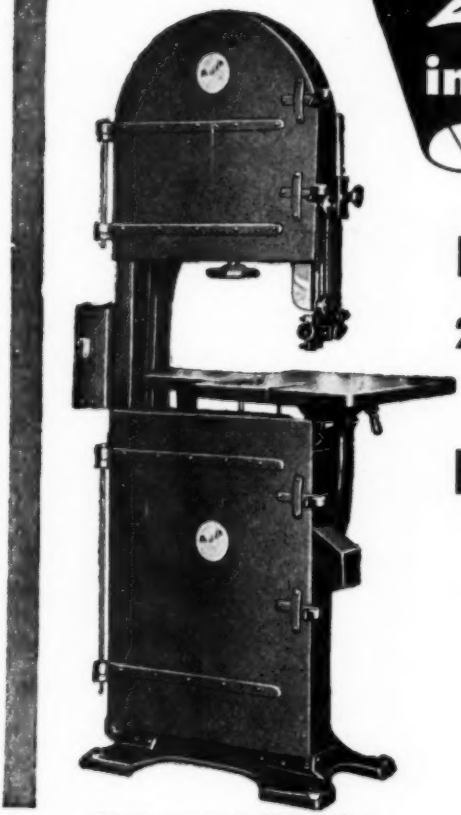

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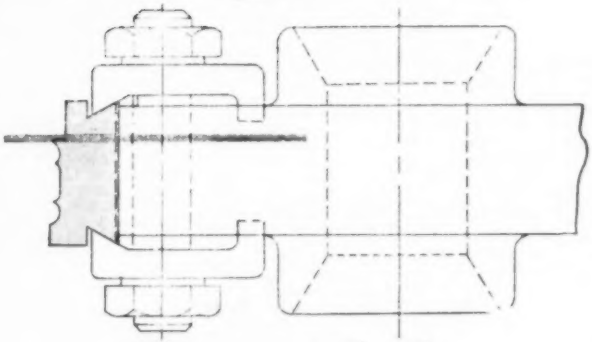

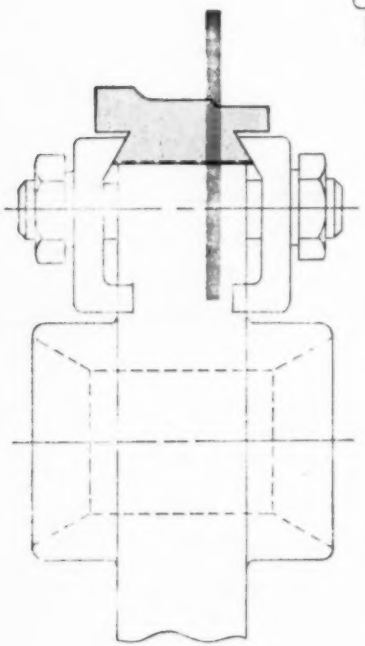

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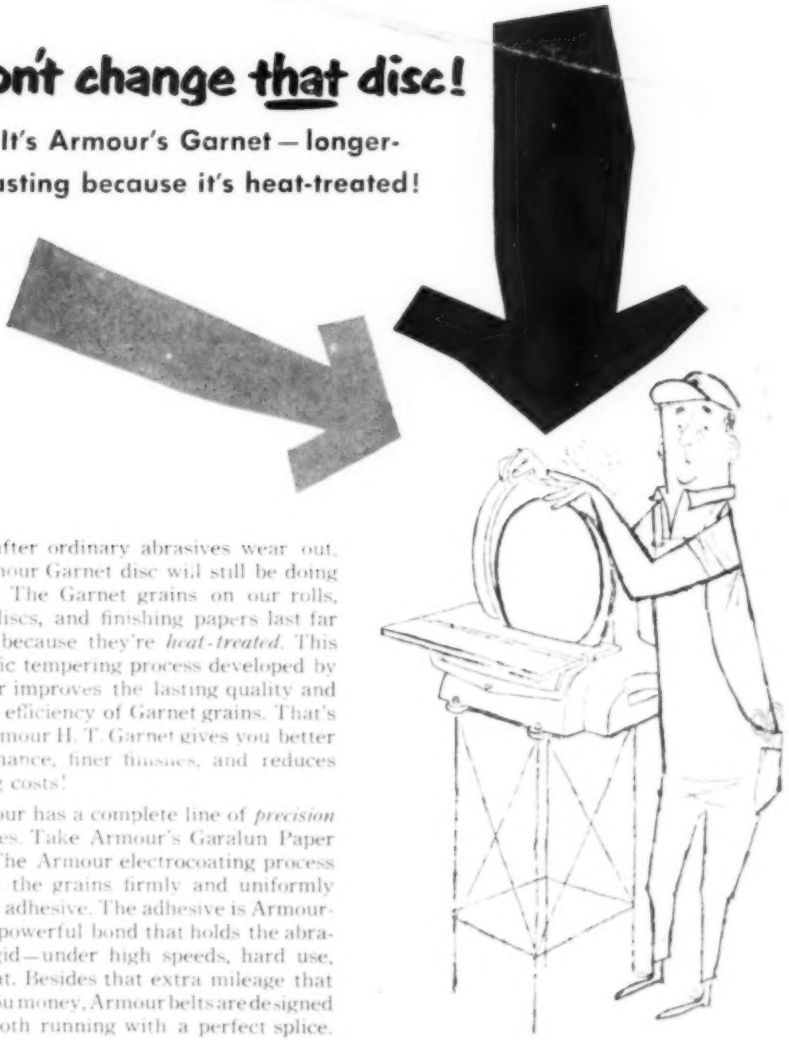

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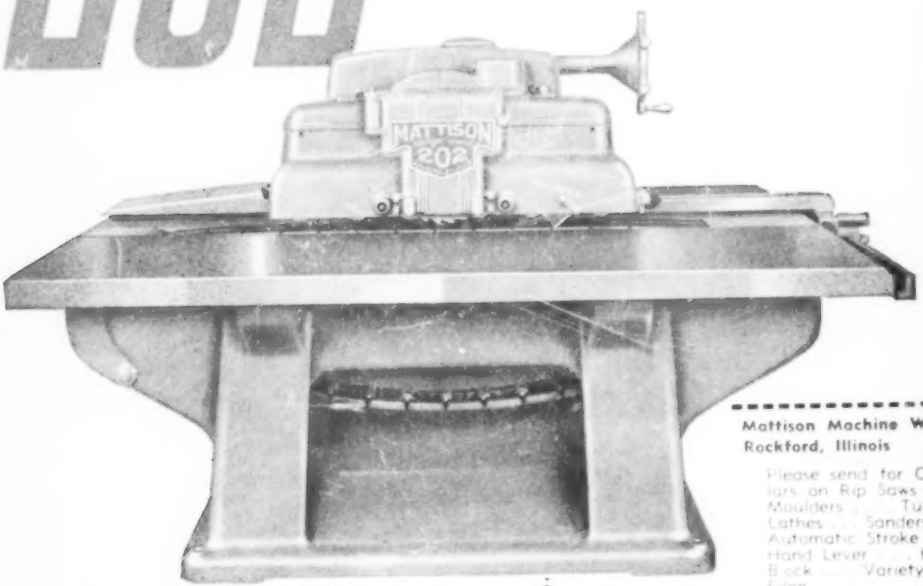

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